

**Development of a cultivar selection smartphone app for southeastern US bunch grape and muscadine vineyards. (progress report)**

Cain Hickey (PI)  
University of Georgia  
200 Hoke Smith Building  
Athens, GA 30602  
vitis@uga.edu

Patrick Conner (co-PI)  
University of Georgia  
2360 Rainwater Road,  
Horticulture  
Tifton, GA 31793  
pconner@uga.edu

Tremain Hatch (co-PI)  
Virginia Tech  
Alson H. Smith, Jr. AREC  
595 Laurel Grove Road  
Winchester, VA 22602  
thatch@vt.edu

Dave Lockwood (co-PI)  
University of Tennessee  
252 Ellington Plant  
Sciences  
Knoxville, TN 37996  
lockwood@tennessee.edu

Mark Hoffman (co-PI)  
North Carolina State  
University  
2721 Founders Drive  
Room 258  
Raleigh, NC 27601  
mhoffma3@ncsu.edu

Elina Coneva (co-PI)  
Auburn University  
110 Funchess Hall  
Auburn, AL 36849  
edc0001@auburn.edu

Renee Threlfall (co-PI)  
University of Arkansas  
2650 N Young Ave  
Fayetteville AR 72762  
rthrelf@uark.edu

Clark MacAllister (co-PI)  
University of Georgia  
Cooperative Extension  
Dawson County  
298 Academy Ave  
Dawsonville, GA 30534  
clarkmac@uga.edu

Paula Burke (co-PI)  
University of Georgia  
Cooperative Extension  
Carroll County  
900 Newnan Rd  
Carrollton, GA 30117  
pjburke@uga.edu

Nathan Eason (co-PI)  
University of Georgia  
Cooperative Extension  
White County  
1241 Helen Hwy Suite 110  
Cleveland, GA 30528  
neason@uga.edu

Karen Blaedow (co-PI)  
North Carolina State  
University Cooperative  
Extension  
Henderson County  
100 Jackson Park Rd.  
Hendersonville, NC 28792  
kebussey@ncsu.edu

Joanna Radford (co-PI)  
North Carolina State  
University Cooperative  
Extension  
Surry County  
210 N Main St.  
Dobson, NC  
joanna\_radford@ncsu.edu

**Public abstract:** The wine and grape industry had an estimated economic impact of over \$15 billion across the southeastern US in 2017. The wine and grape industry is thus a fiscally important resource and economic stimulant for several southeastern states. Growing appropriate grape cultivars is a proactive way to increase the probability of crop success. Choosing the right grape cultivar is particularly important in the southeastern US where the humid climate intensifies disease pressure. The appropriate selection of regionally suitable grape cultivars will optimize the perennial production of economical amounts of quality, disease-free grapes. We thus sought to develop a southeastern US regional grape cultivar selection tool using two primary sources of information –

university viticulture/small fruit extension specialists and vineyard owners/managers. The tool will help southeastern US growers choose cultivars that work best at their intended planting location. US Surveys were sent out to industry stakeholders after harvest in 2019. Results remain preliminary, as only 43 survey responses have been collected to date. Results can be found in a progress report under “Research/Current Sponsored Projects” at <https://smallfruits.org/>. Once survey responses reach a critical mass (e.g. 100 to 150 total responses), the information will be presented in two forms of outreach media – an interactive, smartphone app and a physical/electronic PDF extension publication.

**Introduction:** The wine and grape industry had an estimated economic impact of over \$15 billion across the southeastern US in 2017. The wine and grape industry is thus a fiscally important resource and economic stimulant for several southeastern states. Growing appropriate grape cultivars is a proactive way to increase the probability of crop success. Choosing the right grape cultivar is particularly important in the southeastern US where the humid climate intensifies fungal disease pressure and leads to imbalanced source/sink ratios in grapevines. The appropriate selection of regionally suitable grape cultivars will optimize the perennial production of economical amounts of quality, disease-free grapes. The frequency of moderate winters in southeastern US grape-growing regions has also increased the incidence, and future threat, of Pierce’s disease (PD) in susceptible cultivars. Judicious grape cultivar selection can increase the success of initially planted, as opposed to remedially planted, vineyards. The appropriate selection of regionally suitable grape cultivars will optimize the perennial production of economical amounts of quality, disease-free grapes.

The southeastern US needs bunch grape and muscadine cultivars that are regionally sustainable, economically productive, and produce wines of high consumer preference. Thus, while cultivar selection is a ubiquitously-important decision across all geographic regions, it is arguably one of the most important considerations in the southeastern US. The vineyard and winery industries in the southeastern US are small, yet fast-developing, relative to other domestic vineyard industries which have been established for three to four decades. Unfortunately, novice growers often choose cultivars based on wines they like to drink, or what the “feel” will work at their location. Those are not well-educated, scientifically-supported reasons to choose a grape cultivar. Cultivar selection guidance is therefore justified and needed. Growing cultivars that have a proven history of “working” (i.e. are pest tolerant and produce healthy crops) is sensible over trying to grow cultivars that have a documented history of repeated failures.

Difference in meso-climate will result in distinction of the most suitable cultivars across the states involved in the Southern Region Small Fruits Consortium. For example, the cultivars that work best for bunch grape wine production in northern Virginia and western North Carolina can differ from what is best in the Georgia piedmont and Yadkin Valley in North Carolina. Similarly, the most suitable muscadine cultivars in southern Georgia can differ from what is best in the North Carolina piedmont. Growers have planted *V. vinifera* in the Georgia piedmont, a region of high PD-threat. That is an example of an uninformed decision because: (1) grape integrity greatly diminishes before grape maturity in *V. vinifera* cultivars planted in such regions with high fungal disease

pressure; and (2) *V. vinifera* cultivars are susceptible to PD. Growers in North Carolina have conveyed the need to replant vineyards with PD-tolerant cultivars due to PD infection of initially-planted cultivars; they are thus in need of information about suitable options for cultivar replants. Growers may continue to make *initial* planting mistakes, and/or be uninformed about well-advised *replant* options, unless information on the most sustainable, regionally- and locally-suitable grape cultivars is captured and presented in a practical, digestible format.

The team of assembled PIs work within several southeastern US states. They will thus be able to provide statewide information and be able to solicit local information from growers across the state about cultivar traits and performance. Such effort is imperative, as the local-suitability of cultivars varies across and within many southeastern US states due to great differences in heat, cold, and pest pressures. The PIs collective efforts will result in a deliverable that covers a wide geographic region (southeastern US), but with specific, not generalized, information on local cultivar suitability and success. We propose information about regional and local grape cultivar suitability be gained through two methods. First, the development and dissemination of surveys to grape growers in Georgia, Tennessee, North Carolina, Virginia, Alabama, and Arkansas. Second, the completion of the same surveys by university personnel that have viticulture specialty in each of those states. The survey results from growers and university personnel are anticipated to be similar, but results will be compared and contrasted and either averaged or presented separately. The PIs propose that the results of the surveys be used in the development of a southern regional grape cultivar selection smartphone app as well as an extension publication that summarizes survey results. These outputs will be made available to industry members at no charge. This proposed grape cultivar selection tool is anticipated to be a useful resource for new industry members looking to plant a vineyard for the first time, but also for current industry members looking to replace vineyard blocks or expand their current acreage by planting new vineyards.

**Description of Outreach Activity:**

Spring 2019: PIs and Chuck Barger (BugWood Apps) met online to discuss ideas and develop initial survey “outline.”

Summer 2019: PIs formatted and edited survey.

Fall 2019: PI shared survey on UGA Extension Viticulture Blog and shared with other co-PIs to send out to stakeholders.

Winter / Spring 2019: Chuck Barger (BugWood Apps) will be contacted to develop the interactive app that is county- and state-based and will update as new survey responses are generated.

**Results or Outcome:**

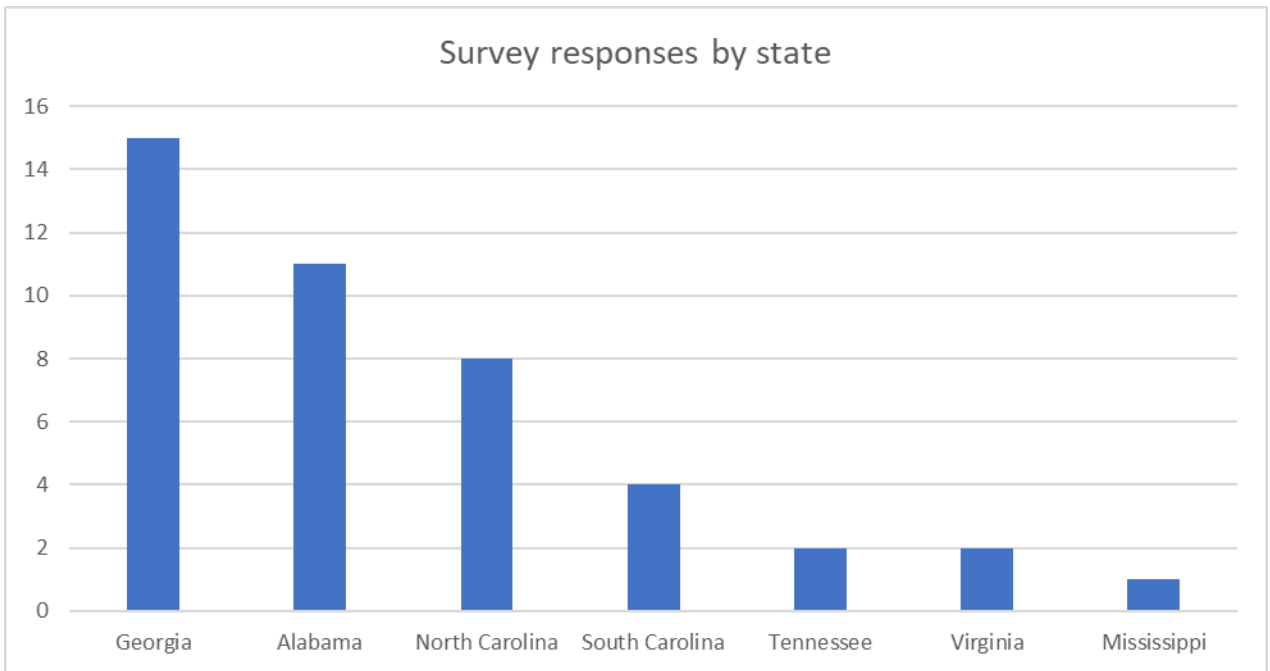
The survey was developed and made available online:

[https://ugeorgia.ca1.qualtrics.com/jfe/form/SV\\_8AiNLTxm9EpY6wd](https://ugeorgia.ca1.qualtrics.com/jfe/form/SV_8AiNLTxm9EpY6wd)

The survey link was shared through the UGA Extension Viticulture Blog on October 25, 2019 (on that date, all other co-PIs were asked to share the survey with their stakeholders): <https://site.extension.uga.edu/viticulture/2019/10/cultivar-selection-smartphone-app-for-the-southeastern-us/>

**Responses by state:**

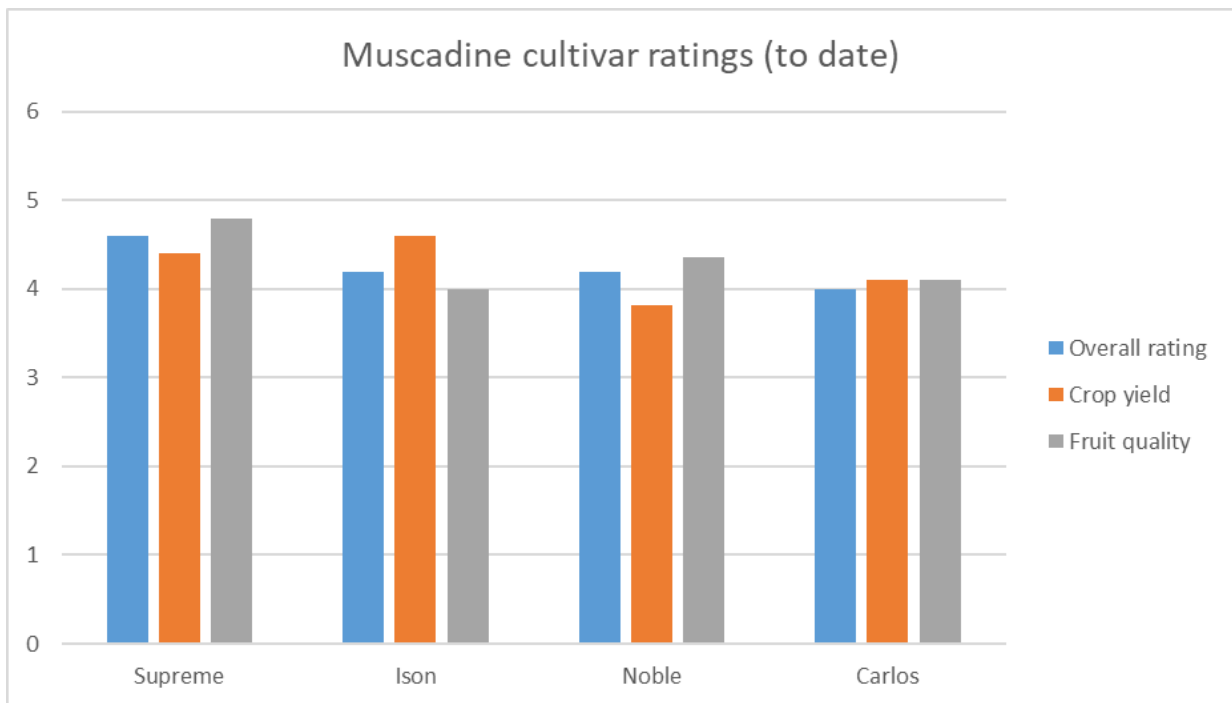
To date, most responses were from Georgia growers, followed by Alabama, North Carolina, and South Carolina. However, Virginia and North Carolina have the largest industries in the southeastern US. Thus, the cultivar rankings below should be considered preliminary as several more survey responses are anticipated from several stakeholders, but especially from those Virginia and North Carolina.



Select results (minimum of five responses per cultivar required) on crop yield, fruit quality, and overall rating (a rating based on productivity, disease tolerance, and fruit quality). NOTE: surveys also asked for ranking of cluster and foliar disease tolerance and well as susceptibility to cold injury, spring frost, and Pierce's disease; that data will be shared in the cultivar smartphone app and future extension publications.

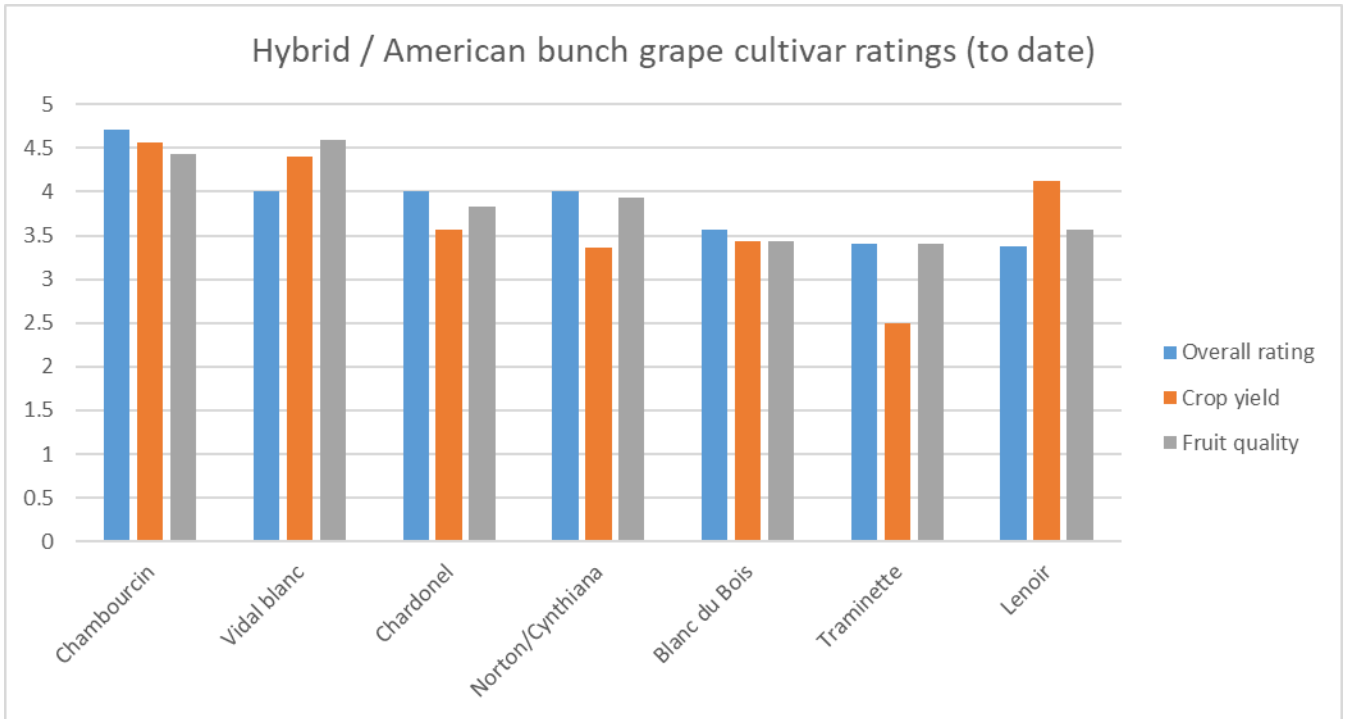
**Muscadines:**

Supreme was ranked highest overall and also ranked highest for fruit quality, while Ison was ranked highest for crop yield.



**Hybrid/American bunch wine grapes:**

Chambourcin was ranked highest overall and also ranked highest for crop yield. Traminette and Lenoir were ranked lowest overall and Traminette was ranked lowest for crop yield. Vidal blanc and Lenoir received high rankings for crop yield. Vidal blanc and Chambourcin were ranked highest for fruit quality while Blanc du Bois and Traminette received lower ranking for fruit quality.



***Vitis vinifera* bunch wine grapes:**

Petit Verdot was ranked highest overall and was also ranked highest for fruit quality. Cabernet Sauvignon was ranked lowest overall. Merlot and Cabernet franc crop yield were ranked slightly higher relative to Petit Verdot and Cabernet Sauvignon. Cabernet franc and Merlot fruit quality were ranked higher than Cabernet Sauvignon.

