

**Southern Region Small Fruit Consortium**  
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**Title:** Eastern Piedmont Wine Grape Cultivar Evaluation

**Progress report**

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**Objectives:** To evaluate wine grape cultivars in the Eastern Piedmont of Virginia for viticultural and enological suitability

**Justification:** Virginia Tech began a formal evaluation of 19 wine grape varieties at the Southern Piedmont Agricultural Research and Extension Center (SPAREC) in Blackstone, Virginia (30 miles east of Farmville) in 2000, with some of the planting occurring in 2001. The unique climate of the eastern/southern piedmont warrants a separate evaluation of varieties – day and night temperatures are typically warmer than those of northern Virginia, and the threat of winter injury is lessened; however, bud break is earlier and the region experiences a strong continental climate, which increases the threat of spring frost damage.

**Methodologies:** Generally, our goal with variety evaluations such as that at the SPAREC is to evaluate the material over a 5- to 10-year fruiting period. Our previous variety evaluation at Winchester was maintained from 1988 through 1998, with harvest and wine data collected over eight years. We are interested in both the viticultural (yield components, pest issues, vine size/vigor, adaptation to local climate) and enological performance of varieties (see, <http://www.ext.vt.edu/pubs/viticulture/463-019/463-019.pdf>). The day-to-day management of the Blackstone vineyard is carried out by staff of the SPAREC with assistance and oversight by Dr. Jeremy Pattison. We also acknowledge the excellent support provided by Ned Jones, Margaret Coates, Mac Tilson and other staff at the SPAREC in this effort. Wine-making is done within the Department of Food Science and Technology on the main campus by Dr. Bruce Zoecklein, Sandy Birkenmaier and others. Staff from the Winchester AREC (Kay Miller, Fritz Westover, T. Wolf and occasionally others) visit the SPAREC for pruning, shoot-thinning, crop thinning, and harvest, with harvest comprising many visits due to the period over which the varieties ripen.

The vines at SPAREC are planted in three-vine plots (8 feet between plants) in rows that are 10 feet wide (to accommodate the equipment available at the SPAREC). Plots are replicated 6 times in a completely randomized design for a total of 18 vines per variety. The exception to this is for Norton which, due to its sensitivity to sulfur and copper fungicides, is planted separately and trained to Geneva Double Curtain. The vineyard has drip irrigation and a deer exclusion fence. Vines (except Norton) are trained to Smart-Dyson. Typically, shoot density is set by dormant pruning and shoot-thinning to result in about 5 shoots per foot of canopy for the upper

canopy and about 3 shoots/foot for the lower canopy. Crops in 2005 and again in 2006 were regulated through cluster thinning to target approximately 3.5 tons/acre, equivalent. This worked well in most cases but we still over-cropped some of the large-clustered varieties in 2006.

**General results to-date:** Harvest data were collected in 2004, 2005 and 2006, and while it is preliminary, some trends are appearing. Wildlife has been troublesome at the vineyard: Bird netting was purchased and applied in late-August 2006, without further incidence. Wasps and hornets remain troublesome and we continue lose some fruit to these insects. Fruit rots due to late-summer rains have been a chronic problem at Blackstone, but those same rains have also allowed us to evaluate varieties under very challenging grape growing conditions.

*Severe rot problems affected the following varieties in 2005 and, to a lesser extent, in 2006*

Aleatico  
Tempranillo  
Tinta cao  
Touriga nazionale  
Petit Verdot  
Muscat blanc

*Moderate rot problems occurred with:*

Rousanne  
Vidal blanc  
Traminette

*Reasonably good fruit quality has been achieved with:*

Petit Manseng (looks excellent)  
Chardonnay (problems have occurred with powdery mildew)  
Viognier  
Cabernet Sauvignon #337  
Cabernet franc – 2 separate clones (poor fruit color density)  
Norton (very good quality)  
Tannat (need to severely restrict crop)  
Mourvedre (need to severely restrict crop)  
NY 73.0136.17 – now named 'Noiret' (fruit had neutral flavors, but was clean)

We have had chronic problems with the first 6 varieties listed above and are not optimistic about their performance at the Southern Piedmont AREC. The clear winners in the vineyard (we have not tasted Dr. Zoecklein's wines yet), to date, are Petit Manseng, Cabernet Sauvignon and Norton.

Our chief concern about the Southern Piedmont vineyard is now the increased incidence of Pierce's Disease (PD) observed in 2006. ELISA testing of plant material by Virginia Tech's grape pathologist confirmed the presence of PD bacteria in affected vines, which appear to represent 3 to 5% of the original planting.

**Detailed results:** We have not yet (1 December 2006) summarized the harvest and fruit chemistry data from 2006; that will occur during January and February. Detailed data are therefore shown for the 2005 season (Table 2). Generally, the grapes at the SPAREC have had higher pH values at harvest, for a corresponding sugar concentration, than what we have seen at the cooler Winchester site (example here with Viognier and Vidal, both of which have been grown at Winchester and Blackstone). This is likely due to the higher heat summations at

Blackstone, compared to Winchester. The Cabernet Sauvignon clone #337 is of particular interest in that it ripens much earlier than either of the Cabernet franc clones at Blackstone – we harvested clone #337 at the same date that we harvested Chardonnay in 2005. Clone #337 is noted for its relatively small berries and deep color. Clone #337 is also known to be virus-infected (Rupestris stem-pitting and type-2 leafroll), but the consequences of this infection are not certain. We have not seen obvious virus problems with the clone #337 vines after 5 years in the ground.

Viognier and Traminette, which are also grown at Winchester, have not expressed as intense flavors or aromas at harvest at Blackstone as they do at the Winchester site. Again, that may reflect the greater heat experienced at Blackstone. As with many of the varieties grown at Blackstone, Viognier fruit has a relatively high pH (Figure 3), at the point when soluble solids exceed 20 or 21 °Brix.

We've lost several of the Tempranillo vines to vascular pathogens (e.g., crown gall) and/or winter injury. It's uncertain at this point whether we simply started with poor nursery stock or whether the vines are not adapted to the Blackstone environment. The fruit matures early and has had mediocre quality. Noiret (formerly, NY73.0136.17), similarly colors early, but does not acquire perceptible flavors or aromas or soluble solids levels greater than about 18° Brix. Aleatico and Muscat blanc also mature early. These are both aromatic varieties and (consequently) suffered significant depredation by raccoons and green June bugs this year. If we can eliminate the wildlife problems, these varieties might find an interesting niche in the eastern/southern piedmont, perhaps as used in conjunction with fruit drying to produce wines with more concentration and/or residual sweetness. Tannat and Norton looked reasonably good at harvest. We have been able to achieve much lower acid levels at Blackstone than at Winchester with Norton, a reflection of the lower vigor and more open canopies at the Blackstone site.

Selected components of crop yield for the 2005 season are presented in Table 2. We had arbitrarily targeted 3.5 tons/acre in 2005; however, we fell well short of that with several varieties, including Cabernet Franc clone #313. Despite the lower yields, clone #313 failed to accumulate sugar to the same extent as the more heavily cropped Cabernet franc #1. Tannat greatly exceeded our target crop level (Table 2). Target crop levels will be adjusted upwards and possibly lower, in time, to more fully evaluate the effects of crop level on fruit and wine quality.

Again, this is a very preliminary progress report and no firm conclusions can be made to recommend one variety over another. Pruning weight data are being collected with all varieties and pruning weights have been acceptable (> 0.3 pounds per foot of row) or supra-optimal. The wines being made from the Blackstone fruit will be subjected to chemistry and sensory evaluations and will help identify varieties that are relatively superior performers in the relatively warm part of the state.

**Conclusions and impact:** Premature to state at this early juncture.

Table 1. Harvest date and primary fruit chemistry of varieties/clones being evaluated at the Southern Piedmont Agricultural Research and Extension Center, Blackstone, Virginia, in 2005.

Variety (clone)	Harvest date	Brix	pH	TA (g/L)
Aleatico	N/A			
Cabernet franc ("#313")	26 Sept-05	18.3	3.85	5.01
Cabernet franc (#1)	26 Sept-05	20.5	3.87	4.60
Cabernet Sauvignon (#337)	12 Sept-05	20.3	3.74	5.42
Chardonnay (#96)	12 Sept-05	21.8	3.81	4.85
Mourvedre	19 Sept-05	20.8	3.92	4.32
Muscat blanc	12 Sept-05	19.1	3.73	4.70
Norton	26 Sept-05	22.2	3.88	6.11
Noiret	7 Sept-05	17.3	3.46	5.18
Petit Manseng	12 Sept-05	25.2	3.28	8.08
Petit Verdot	20 Sept-05	21.7	3.92	5.26
Rousanne	12 Sept-05	21.8	3.75	5.45
Tannat	19 Sept-05	21.5	3.43	6.08
Tempranillo	7 Sept-05	19.5	3.80	5.56
Tinta cao	19 Sept-05	20.5	3.64	4.38
Touriga nazionale	19 Sept-05	18.9	3.61	4.42
Traminette	19 Sept-05	19.8	3.51	4.53
Vidal	19 Sept-05	21.7	3.51	5.38
Viognier	12 Sept-05	22.9	3.97	5.04

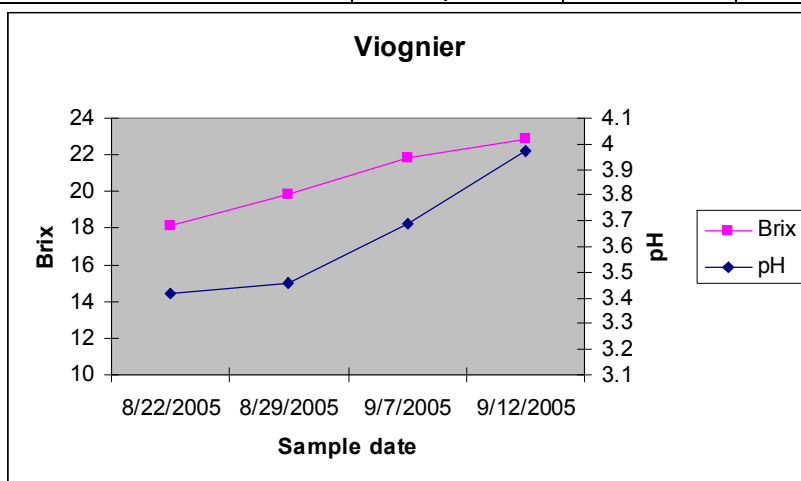


Figure 3. Berry Brix and pH of Viognier in advance of harvest in 2005.

Table 2. Components of 2005 crop yield for varieties/clones being evaluated at the Southern Piedmont Agricultural Research and Extension Center, Blackstone, Virginia.

Variety (clone)	Berry wt. (g)	Cluster wt. (g) <sup>x</sup>	Crop per vine (lbs) <sup>x</sup>	Tons per acre equivalent <sup>x</sup>
Aleatico	.	.	.	.
Cabernet franc ("#313")	1.60	75.8 def	7.5 d	2.05 d
Cabernet franc (#1)	1.75	115.0 bc	17.0 ab	4.62 ab
Cabernet Sauvignon (#337)	1.14	83.5 cde	17.5 ab	4.78 ab
Chardonnay (#96)	1.22	115.8 bc	14.7 bc	4.00 bc
Mourvedre	1.47	172.5 a	12.0 cd	3.28 cd
Muscat blanc	1.55	203.6 a	.	.
Norton	1.33	.	.	.
NY73.0136.17	1.50	.	.	.
Petit Manseng	0.85	61.9 ef	11.3 cd	3.07 cd
Petit Verdot	1.20	49.2 f	11.2 cd	3.07 cd
Rousanne	1.64	105.6 bcd	13.5 bc	3.69 bc
Tannat	1.51	200.6 a	19.6 a	5.35 a
Tempranillo	1.95	.	.	.
Tinta cao	1.10	106.9 bcd	10.8 cd	2.96 cd
Touriga nacional	1.20	58.4 ef	10.5 cd	2.86 cd
Traminette	1.49	131.2 b	12.8 bc	3.50 bc
Vidal	1.68	175.7 a	.	.
Viognier	1.31	113.4 bc	12.8 bc	3.50 bc

<sup>x</sup> Means within a column that are followed by the same letter are not significantly different.