A CONTINUING PROJECT PROPOSAL TO:

VIRGINIA WINE BOARD

WINE GRAPE VARIETY EVALUATIONS

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Start date: 1 July 2007 (for current funding request)
Termination date: 30 June 2008 (for current funding request)

Amount requested in current year: $13,983

A. Title: Wine grape cultivar evaluations

B. Date: 1 July 2007

C. Duration: one year

D. Objectives:

1) To evaluate Chardonnay clones for relative strengths and weaknesses (viticultural and enological)
2) To evaluate Traminette, Cabernet Franc, and Viognier under three different training systems
3) **To evaluate novel wine grape cultivars in the Eastern Piedmont of Virginia.**

E. Justification / practical importance:

Note: The first two objectives have been completed and data are being presented to industry in meetings and through preparation of journal and trade publication articles in next 24 months. <u>The current proposal is aimed only at the final objective.</u>

Cultivar evaluation: The outcome and benefits of the cultivar evaluation at the Southern Piedmont Agricultural Research and Extension Center in Blackstone, Virginia are expected to include several new (for the region) wine grape cultivars that can be recommended for the Eastern Piedmont of MD, VA and NC, where spring frost, high heat, and abundant precipitation during the fruit maturation period are chronic threats to grape yields and fruit quality. Currently, we have very few cultivars that can be endorsed for this region of the eastern seaboard and yet many requests for such information are originating from the region, particularly as traditional agricultural products, such as tobacco, are becoming less profitable.

F. Background:

A wine grape cultivar evaluation was established at Virginia Tech's Southern Piedmont AREC in Blackstone, Virginia in spring, 2001. Cultivars include NY73.0136.17, Vidal, Traminette, Norton, Tannat #1, Mourvedre, Viognier #1, Rousanne #1, Cabernet Sauvignon #7, Cabernet Sauvignon #337, Chardonnay #96, Tempranillo, Petit Manseng, Touriga nacionale, Tinta cao, Aleatico, and Muscat blanc. Norton is ungrafted. All others are grafted either to C-3309, 5C, or 101-14. Cultivar rationale is based on favorable performance (P. Manseng, Mourvedre, Vidal, Viognier, Cabernet Sauvignon) at Winchester (Wolf et al., 1999), a late-bud break characteristic (e.g., Vidal, Cabernet, Tannat, Mourvedre), pronounced aromas or flavors that might persist under less than optimal ripening conditions (e.g., Muscat blanc, P. Manseng), limited, but favorable commercial experience (e.g., Norton, Tinta cao, Touriga), or combinations of those reasons. Plantings consist of 3-vine plots (8 feet between plants), replicated six times in a completely randomized design. Drip irrigation and deer exclusion fencing are used. Row width is 11 feet. Vines and vineyard are managed as above. While of a preliminary nature, our initial results of the variety evaluation have been relayed to industry by means of the Viticulture Notes (Sept-Oct., 2005). The vineyard at Blackstone has been used on several occasions for dormant pruning demonstrations for area growers.

G. Procedures:

The procedures are generally identical to those outlined in the previous years' proposals with the exception that with increased presence of Pierce's Disease, a more aggressive approach to management of this disease is needed. In addition, the southern and eastern Piedmont is warm/hot (day and night temperatures) and can received substantial rain during the fruit ripening months of August-October. While the threat of winter injury is lessened, bud break is advanced relative to the northern part of the state, increasing the risk of spring frost injury. The climatic uniqueness of the region justifies specific cultivar evaluations.

Vineyard management: Typically, shoot density is set by dormant pruning, with follow-up shoot-thinning at the 6- to 12-inch shoot length stage. Vines have been trained to a Smart-Dyson training system, with approximately 12 shoots/m of cordon trained upwards, and about 6 shoots/m of cordon trained downwards. That training will be adjusted, however, in 2007. While the Smart-Dyson training allows for higher yields, it also complicates application of bird netting. We will therefore move to a single-curtain training (vertical shoot-positioned, VSP) in 2007. Crops will be regulated in 2007 to about 4.5 tons/acre equivalent. This will be accomplished by using average cluster weights from harvest of preceding seasons, and calculating a maximum number of clusters per vine desired to target about 4.5 tons per acre. Pest management, particularly fungal disease management will aim to keep vines free of disease, rather than intentionally evaluate disease susceptibility. Bird netting will continue to be used to avoid bird depredation.

Management of Pierce's Disease: We plan to implement two strategies in 2007 for Pierce's Disease (PD) management. The entire vineyard will be treated twice with Admire Pro (imidacloprid) insecticide per label directions, starting shortly after fruit set. Admire Pro is a systemic, neonicotinoid insecticide that is applied to soil via drip irrigation (installed and operative at Blackstone). The target insects are leafhoppers that vector the PD bacterium. We anticipate some reduction in new infections occurring by using this approach. The second avenue of management will compare the existing cordon-training and spur-pruning with head-training and cane-pruning. The logic here is that the head-training might eliminate bacteria from infected portions of the vine by reducing the amount of perennial wood carried over from year to year. One-half, or three, of the treatment (variety) replicates will be randomly assigned to head-training, with the other half retaining the cordon-training configuration at pruning in winter, 2007. All vines will be scored in August or September for presence and severity of PD incidence.

Fruit sampling and components of yield: A minimum of 50 berries will be randomly collected from each cultivar plot as follows: Fruit samples will be collected at 7- to 10-day intervals beginning at approximately 16 °Brix, until and including day of harvest (the low-Brix starting point is necessary with Muscat blanc). Cultivars will be harvested at approximately 20 to 23 °Brix (season permitting), with the harvest decision predicated upon disease incidence, fruit aroma and taste, and imminent climatic or wildlife threats. Yield components for all experiments will include clusters per vine, cluster weight, berries per cluster, berry weight, and fruit weight per vine.

Fruit chemistry: Basic fruit chemistry analyses will be performed at the Southern Piedmont AREC in Blackstone. Soluble solids, titratable acidity and pH will be determined on fresh (non-frozen) berry samples within 48 hours of collection.

Cane pruning weights and other measures: Cane pruning weights, a measure of vine capacity, will be annually collected at dormant pruning on a per vine basis. Observations on incidence of crown gall, other trunk disorders, and winter cold injury will be annually recorded. To date, we have lost several Tempranillo vines to what appears to be a combination of crown gall and low temperature injury.

Small-lot wine-making: While not within the scope (or budget) of the effort proposed here, small lots of wine are, and will continue to be, made from each cultivar or clone within each experiment, over multiple years. This aspect is conducted by Dr. Bruce Zoecklein of Virginia Tech's Department of Food Science and Technology.

Statistical analyses: The completely randomized experimental design allows for a straightforward one-way analysis of variance using PROC GLM procedures of SAS and multiple means comparison features such as Tukey's LSD test to compare the performance (e.g., berry weights or pruning weights) of one variety with another, within a given year. Multiple year performance will be modeled using repeated measures (years as the repeating measure) within the PROC MIXED SAS procedure.

Technology Transfer Plan: This is a long-term, applied research project. Preliminary results (all three original objectives) have been relayed to the wine industry via the following presentations:

- "Comparative results of three training systems in Winchester" Virginia Vineyards Association Annual Technical Meeting, 13-15 Feb., 2003, Charlottesville VA.
- "Fruitfulness and fruit quality of 'Viognier' in response to Vertical Shoot Positioning, Smart Dyson, or Geneva Double Curtain training", ASEV/ES 29th Annual Meeting, July 2004, Roanoke, VA
- "Evaluation of Viognier Musts and Wine as Affected By Training System", ASEV/ES 29th Annual Meeting, July 2004, Roanoke, VA.
- "Training system and rootstock effects on Traminette fruitfulness, fruit yields, and vegetative performance". ASEV/ES Annual Meeting , July 2005, St. Louis, MO.
- A manuscript on Viognier wine quality, as affected by training system, is currently in preparation.

H. Personnel and facilities:

Dr. Tony Wolf will oversee viticultural aspects of work. The AHS AREC has all field and laboratory equipment to accomplish the proposed effort. Dr. Jeremy Pattison is the Small Fruit and Specialty Crops Specialist at the Southern Piedmont AREC. Dr. Pattison will oversee day-to-day activities associated with the project. While not a formal part of this specific proposal, Dr. Bruce Zoecklein is involved with wine-making of the varieties grown at Blackstone.

I. Other entities: None involved

J. Source of other funds: Partial support had been sought from the Viticulture Consortium:East; however, Viticulture Consortium will not be funded this year.

K. Budget:	Sought from VA Wine Board (July 2007)	OSP: PAN award for Wolf	OSP: PAN award for Pattison
Wages	11,060	3,360	7,700
Wage fringe (8.5%)	941	286	655
Travel	832	832	0
Supplies	1,150	0	1,150
Total	**$13,983**		

Budget justification and description:

- *Wages:* Wage support is sought primarily for the Blackstone vineyard as $11/hr x 28 weeks x 25 hours/week = $7,700. Winchester request based on $12/hr x 28 weeks x 10 hours/week, on average = $3,360 and would cover the wage support hired through Winchester for this project
- *Wage fringe rate* of 8.5% is negotiated rate for Virginia Tech, commencing July 2007.
- *Travel* is figured at 374 miles round-trip from Winchester to Blackstone, VA, 6 trips/year, and a mileage rate used by Virginia Tech of $0.445 per mile = $832
- *Supplies*: Laboratory materials for fruit sampling and processing and bird exclusion netting (Blackstone).

NOTE: The two shaded columns in the above budget are for internal use by our Office of Sponsored Programs if project is funded at requested.