

**Surry Community College
Dobson, North Carolina
SERA Report 2006**

Background:

In 1999, Surry Community College established a viticulture and enology program (grape growing and winemaking) to serve the state's wine and grape industry and enhance economic opportunity for North Carolinians. At Surry Community College, students from throughout North Carolina and surrounding states benefit from "hands-on" training, study and industry "networking" opportunities. Graduates and entrepreneurs go on to own, operate and work in the state's new vineyards, wineries and related businesses; such as retail, consulting, vineyard maintenance and industry supply services. Surry County is home to one of the largest plantings of vinifera (traditional European winegrapes) on the east coast, located within the recently designated Yadkin Valley AVA (American Viticultural Area).

Initial program funding was from private sources. Additional funding came from an F.I.P.S.E. grant (Department of Education) and the Golden Leaf Foundation (2003, 2004, 2005). Golden Leaf funding supported a very successful internship program which allowed students to apply their new knowledge and skills while providing vineyard and winery owners with much needed skilled labor. Access to local operations is fundamental to internships and part-time employment for students. "Hands-on" learning by doing and problem solving is emphasized. Several applied "best practice" studies and applied viticulture research projects have been initiated at Surry Community College. These studies have been conducted by Surry instructors and students with cooperating institutions and agencies (Virginia Tech University, North Carolina State University and North Carolina Department of Agriculture). These studies provide grape growers and winemakers a chance to observe and evaluate new, different and possible cutting-edge practices that aim to enhance the competitiveness of the North Carolina industry. Through the studies, students gain experience, have the opportunity to offer their input and implement some of their own ideas, ultimately presenting their findings in formal reports to industry.

Students initially registering for Viticulture and Enology courses at Surry were student/entrepreneurs seeking knowledge and skills to apply directly in their own vineyards and wineries. Recently, high school graduates, young adults and those seeking a career change have entered the program to learn skills for employment or to augment family operations. The school's facilities include a 4.5 acre vineyard, a bonded winery (2,500 gallon capacity), crush pad, bottling line, laboratory/classroom and barrel room for aging wine. A viticulture field lab/shop building was completed in 2004. Recently, the North Carolina Legislature appropriated funding to provide for initial planning for a state viticulture and enology center to serve the state's wine and grape industry to be located on the Surry Community College campus.

Two fulltime instructors lead classes in Viticulture (Gill Giese) and Enology (Miss Molly Kelly). SCC also employs a winery/viticulture technician (Mr. Vance

Marion). Mrs. Marion Venable has been instrumental in the successful application of grant funding and administration. Over 500 students have been served since the program's inception and 40 students are currently enrolled. Students participate in curriculum and continuing education classes, field trips to wineries and vineyards, and/or seminars presented by recognized industry professionals. Three classes are available via the internet (Introduction to Viticulture, Vineyard Establishment and Development, and Grape Pests Diseases and Disorders). Curriculum options include: two-year degree (A.S.), a diploma or certificate. Continuing education classes include new grower orientation, production techniques and principles, and economics.

North Carolinians have a strong tradition of making a living from a well-tended sustainable, small farm. Tobacco has historically been the main crop. This agrarian tradition, strong work ethic and excellent agricultural land and climate afford a potential that is not present in many other states. Students who recognize this potential are the foundation of the viticulture and enology program at Surry Community College.

Surry Community College Activities, Accomplishments and ongoing Studies

1.) An Excel Grape Budget System for North Carolina William Boyd and Gill Giese*

An Excel[®] spreadsheet program was developed, incorporated into the viticulture curriculum and presented by SCC student William Boyd at the ASEV (American Society of Enology and Viticulture) Eastern Section. A set of Excel spreadsheets was developed to budget for establishment and production of a 10-acre vineyard, including line items for variable and most of the common fixed costs that the typical grower might encounter over a 26-year period. Years 0 through 3 are establishment years. Year 0 allows for site preparation costs. Year 1 is the planting year, and years 4 through 25 are production years. Separate special-purpose spreadsheets include trellis design and vineyard layout, capital expenses and usage costs, consumable material expenses with usage costs, harvest yields and prices, and a list of variables that recur, such as skilled and unskilled labor costs, interest rates, and others. The user can (1) modify all quantities and costs per acre for "what-if" scenarios; (2) select line items to be included or excluded from any and (3) display or print various views of the budget. Two graphic views of the cumulative expenses and income are on separate spreadsheets. Costs for a variety of materials and capital expenses were collected from local sources in western North Carolina during 2003. A custom toolbar helps generate the scenarios and custom views desired by the end user. This budget tool will be included as a CD-ROM in the upcoming revised publication of the Mid-Atlantic Winegrape Grower's Guide (Eastern WineGrape Production, Dr. Tony Wolf Virginia Tech University Editor).

2.) Book Chapter: Wine grape quality: When is it time to pick?

This chapter will be included in the upcoming text "Winegrape Grower's Guide for Eastern North America" this guide will be published through Cornell University and is edited by Dr. Tony Wolf Virginia Tech University.

3.) Grape Variety and Winery Use/Demand Survey, 2005 (Miss Molly Kelly, instructor and Michael Leonardelli, student)

After the 2005 grape harvest, the Viticulture and Enology Program of Surry Community College conducted the North Carolina Winery Grape Demand Survey.

The results of this survey prove useful to the North Carolina wine and grape industry by helping to identify the future demand for specific grape varieties. By combining the results of this survey with the ongoing Phenology Study conducted by the Viticulture and Enology program at Surry Community College, all North Carolina growers (and perspective growers) may make better informed vineyard decisions. These decisions include: pre-planting and site selection, as well as the selection of new varieties to plant in existing vineyards. All responses were confidential and no wineries are identified in the survey results. There was a response rate of slightly less than 50%, with responses from 24 of the 50 surveys mailed.

Varieties for which survey responders anticipated an increased demand over the next ten years, in descending order:

- Merlot
- Viognier
- Syrah
- Sauvignon Blanc/ Riesling
- Chambourcin/ Cabernet Franc/ Cabernet Sauvignon

The three largest tonnage amounts used by North Carolina wineries in 2005, including both self-grown and purchased grapes, by variety:

Chardonnay:	441.7 tons
Cabernet Sauvignon:	341.6 tons
Merlot:	245.1 tons

In analyzing the responses for 2005, we have placed the results into a database. This will allow us to track trends as we conduct future surveys, more quickly access data through the database (as opposed to adapting relevant data from a static spreadsheets), and to integrate the survey results with the phenology study results.

To that end, we will modify the survey instrument to more easily capture the response data in database format, examine questions for which no responses were generated, and generally simplify the instrument.

4.) Phenological and Vineyard Site Evaluation Project

18 vineyard and/or sites under evaluation/development have continued to be monitored for temperature and GDD (growing degree days). A “vineyard profile” (soil characteristics, topography, trellis system, row orientation, aspect, %slope) has also been developed. Each of the Harvest data (quality and quantity) of several different winegrape cultivars has also been collected over the years 2003, 2004, 2005 and 2006 for each site. This systematic collection of local (western North Carolina) data will provide the following:

- A. Allow a more quantitative evaluation of the correlation between grape quality/yields and particular site characteristics
- B. Develop yield and quality trends to allow a quantitative means to select varieties suited to North Carolina production.

This data can provide the “ground truthing” information needed to make GIS-GPS generated maps meaningful and more accurate. GL funds provided the remote weather data devices and funds for students to travel to the sites and collect, organize, analyze and present data (NCWA annual meeting in Greensboro). To define meaningful trends this study must be continued for at least five years.

5.) Cover Crop and Root Pruning Study

A nearly universal challenge to quality winegrape production in North Carolina is “excess” vine vigor. Excess vine vigor decreases quality and yields of winegrapes and can increase the cost of production through “extra” required canopy management and pesticide applications. A study has been initiated in collaboration with Virginia Tech University and located at a commercial vineyard (Shelton Vineyards, Dobson NC, Surry County). The trial will evaluate the effects of several cover crops (orchard grass, perennial ryegrass, turf-type fescue, tall fescue and Round-up tolerant fescue) and root pruning on excess vine vigor and fruit quality. The hypothesis is that ground covers grown under the trellis and in row middles and/or root pruning imposed on established grapevines will compete for soil moisture and nitrogen to restrict vine vegetative growth. Treated vines will require a reduced amount/degree of canopy management (labor). Fruit composition and wine quality will be improved. This study is expected to take three more growing seasons to complete (thorough 2008 growing season).

If these trials are successful it can be expected that winery manipulation to enhance quality traits will be decreased. A further goal of such a study would be to lessen reliance on herbicides and fungicide applications to control weeds and diseases.

6.) Nitrogen study

The first phase of a study of various nitrogen rates applied to two commercial vineyards (one 12 years old, the other 3 years old) was completed and results presented to the NCDA (North Carolina Department of Agriculture) who was the collaborating agency. This information will be used to refine

nitrogen recommendations to commercial and hobbyist grape growers throughout the state.

5.) Speakers and lecturers: Surry Community College brings in speakers funded by the Golden LEAF foundation some past speakers are listed below. Speaker for this current semester include Dr. Sara Spayd NCSU, Dr. Stanley Howell MSU and Dr. Andrew Waterhouse enologist UC Davis.

Dr. Andrew Landers (Professor of Agricultural Engineering, Cornell University), Dr. Landers presented a demonstration and lecture on vineyard sprayer calibration and operation at the SCC vineyard for over 50 plus winegrape producers and students. He is widely recognized as an expert on orchard and vineyard pesticide application to minimize drift (environmental impact) and maximize efficacy. He is the author of a text on the selection, maintenance and use of farm machinery and numerous publications, extension pamphlets and maintains a website on pesticide application and sprayers (www.nyaes.cornell.edu/ent/faculty/landers/pestapp/) in addition to his teaching and research duties.

Dr. Tony Wolf (Professor of Viticulture, Virginia Tech University) Dr. Wolf has authored over 40 publications and has worked in Virginia for over 20 years as the state extension viticulturist and is now director of the Alston H Smith Research and Extension Center near Winchester Va. DR. Wolf presented a lecture at SCC on the overall state of the industry in Virginia that has over 90 wineries and is valued at over \$90 million dollars. Dr. Wolf is currently collaborating with Surry Community College personnel/students in a study to evaluate various vineyard cover crops to manage vine vigor and maximize winegrape quality (see above).

Dr. Anton Baudoin: (see attachment) plant pathologist, Virginia Tech University, Dr. Baudoin brings nearly 20 years working with winegrape disease problems in the humid environment of the eastern US. Dr. Baudoin's work is crucial to provide guidance for growers in disease control. SCC students have participated in the collection of data and samples for Dr. Baudoin's studies.

Dr. Justin Morris (Distinguished Professor University of Arkansas). Dr. Morris's career has spanned nearly five decades. He presented on the overall grape and wine industry and the mechanization of canopy management and overall mechanization of vineyards to increase efficiency and competitiveness.

Other past speakers include: Dr. Andrew Walker, geneticist, UC Davis, Dr. Gerald White, Economist Cornell University, Dr. Wayne Wilcox, pathologist, Cornell University.

6.) Workshops and Continuing Education

Pruning workshop-- A “hands-on” pruning and vine balance workshop was held in cooperation with the Cooperative Extension Service (Agent Terry Garwood, Surry County). The workshop was attended by over 50 persons from throughout the Yadkin Valley AVA. Both novice and experienced growers attended the ½ day session at SCC demonstration vineyard. Credits toward pesticide certification were available for participation.

The wine and grape business ...is it for me? A day-long program was held at SCC in collaboration with SCC's continuing education division to introduce the fundamental concepts and requirements of starting a vineyard and/or a winery business. This class was attended by over __35-50__ persons and attracted several from out of state.

Berry Sensory Analysis (August): How to quantitatively assess grapes for optimum results in the winery. This will be a one day workshop to introduce and teach a quantitative scorecard technique (used in Australia: Winegrape Berry Sensory Analysis by Winter and Whiting) to judge grapes of varying maturity. The procedure teaches a uniform and standard language for winemakers and grape growers to use. The recognition of benchmarks (color, skin maturity, tannins, sugar content etc.) to assess grape suitability to make into different wine styles is presented. This workshop will be conducted in Fall 2006.

Annual Yadkin Valley Pruning Contest (see attached score sheet) the contest is organized by SCC personnel and held at a commercial vineyard in the Yadkin Valley AVA on a yearly rotating basis. The contest is directed to all field workers that provide the labor for the winegrape industry. A substantial percentage of this group is Hispanic and thus a Spanish speaking judge and a bilingual scorecard was provided. Several students from SCC competed and one served as field judge. Cooperative Extension agent Forsyth Co. Tim Hambrick and vineyard manager Miguel Sanchez (Shelton Vineyards, Dobson) served as field judges. The contest was modeled after similar contests in grape growing regions in Sonoma, California. With continued support from Golden LEAF it is hoped that this contest will attract more participants and grow to be a multi-regional or state contest. Over \$500.00 was awarded in prize money to participants and the contest attracted corporate sponsorship from Orchard Valley Vineyard Supply (a North Carolina based supply business)

ENOLOGY STUDIES

Effects of temperature management on color and tannins in red wines

A common challenge in the production of red wines in North Carolina is the high day and night temperatures that occur during harvest and vinification. These high temperatures can result in spontaneous fermentations production off-odors or incomplete fermentations. The resulting short fermentation times result in diminished color extraction as well as decreases in overall wine texture.

Currently a study is being conducted to examine the effects of extended, temperature controlled fermentation of red wines. The effects of temperature-controlled fermentations vs. uncontrolled will be quantified by monitoring fermentations and by analyzing anthocyanin and tannin content in the three red cultivars: Cabernet Sauvignon, Syrah and Petit Verdot.

Sensory Evaluation

Surry Community College is in the process of establishing a sensory panel to evaluate the quality of North Carolina wines. The sensory laboratory is currently being set up and the selection process for panel members is being finalized. Panel members will then be trained to evaluate wines submitted for commercial acceptability. Wines determined to be flawed will be tested in the college laboratory. Follow-up recommendations would then be made to the submitting winery to determine ways to correct the problem. Submission of samples will be voluntary. SCC will be collaborating with North Carolina State University on this project.

Nitrogen Study

Inorganic nitrogen is essential for grapevine growth and successful completion of fermentation of grape must. Recommended levels of fermentable nitrogen required by yeast for healthy fermentations range from 140 mg/L to 250 mg/L. If assimilable nitrogen levels are too low, fermentations may become stuck and result in the production of hydrogen sulfide and other odors.

Petiole analysis and soil samples were obtained from three red cultivars (Cabernet Sauvignon, Syrah and Petit Verdot) to determine vineyard nitrogen status. After harvesting, yeast assimilable nitrogen content will be determined using the Formal method. A second phase of this study will be to treat the three varieties with different rates of nitrogen and study the effects on the quality of grapes and finished wine.