

Title: Petiole Analysis for Bunch Grapes in the Southeast

Progress Report

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Extension Proposal

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Objectives:

To develop fact sheets detailing uniform protocols for the collection and handling of petiole samples and for the interpretation of analytical results

To introduce viticulturists to petiole analysis and work with them to secure its acceptance as a recommended production practice

To establish desired nutrient levels for bunch grape vineyards in the Southeast

Justification and Description:

As is the case in all fruit crops, a sound nutritional program is essential to maximize returns from bunch grape vineyards. Deficiencies, toxicities or imbalances of certain nutrients can result in a wide array of problems ranging from weak vines incapable of filling their allotted space on the trellis and failure to set enough fruit buds for a crop to excess growth where disease problems are magnified and fruit bud development is impeded due to excessive shade within the canopy. Oftentimes, nutritional problems result in poor growth, yields and quality before any visible symptoms of problems arise. A unique potential problem can occur with bunch grapes in that the ripened grape is only an intermediate step in the winemaking process. Fertilization not only affects vine health and productivity, but also the wine. For example, deficient nitrogen levels in the must can cause sluggish or stuck fermentations. High nitrogen rates may delay soluble solids accumulation, increase juice pH, and increase the nitrogenous compounds in the must and wine. High potassium levels decrease the color, quality and stability of the juice and can cause a high pH and reduced acidity of the berries and the wine resulting in potential instability problems.

Vineyard fertility can be manipulated to increase or decrease vine vigor along with factors such as training systems, canopy management practices and crop load. Higher vigor may be desirable in producing larger crops for certain types of wines and moderate vigor for grapes to be used for premium wines.

A good fertility program for fruit crops includes both pre- and post-plant soil testing, tissue analysis, records of crop yields and quality, observations of vine performance and grower experience. Tissue analysis provides a way to determine nutrient levels in the plant. While leaves or leaflets are used for analysis in most crops, leaf petioles are the accepted tissues used with bunch grapes in the United States and many other countries. The timing for collecting leaf petioles may vary with full bloom or veraison being the recommended options. Petiole tissues at bloom may provide a more accurate measure for elements such as boron and zinc, whereas sampling at veraison may more accurately reflect the status of elements such as magnesium and potassium. Growers are reluctant to sample at both stages due to costs and time involved in collecting and preparing samples.

Petiole analysis can be utilized as a troubleshooting technique to either confirm or deny a suspected nutrient disorder by comparisons of “normal” versus “affected” vines. It may also be used as a way to monitor nutrient levels within vines to detect trends in nutrient levels thus enabling correction of nutrient problems before they become yield or quality limiting. With this latter use, regular sampling of a vineyard over a period of several years will be needed to establish a baseline from which to compare results of future petiole samples.

The validity of petiole test results is only as good as the care taken in securing good samples and preparing them for analysis. Fact sheets will be developed to clearly detail procedures for taking good petiole samples. Information will include time to sample, limiting a sample to one variety/rootstock combination, area to include in one sample, number of petioles needed for analysis and preparation of samples prior to submission for analysis. Interpretation of petiole analysis results can create confusion among growers and information will be developed to enable growers to more easily follow recommendations.

The acreage of bunch grapes in the southeastern states has risen rapidly with the development and continued expansion of the wine industry. Vineyard establishment and maintenance is an expensive, long-term venture. Adequate support for bunch grape growers is lacking in some areas. Currently, university and state laboratories in Georgia, North Carolina and Tennessee do not have standards for petiole analysis of bunch grapes, although developing such capability has become a significant priority. As a result, growers are either not utilizing tissue testing or sending samples to commercial laboratories or laboratories in other states. Developing the capability to service the tissue testing needs of the bunch grape industry and educating growers on the benefits of petiole analysis are the goals of this proposal.

Methodologies:

1. Petiole samples will be collected at full bloom and at veraison from numerous cultivars and from several vineyards in the cooperating states. Samples will be analyzed at laboratories in North Carolina, Georgia and Tennessee and the results compared to compare the two sampling times.
2. Soil samples were collected from vineyards where petiole samples were taken. These samples have been analyzed.

Work to date: Petiole samples were collected at veraison from ten cultivars at a total of nine locations in Georgia and Tennessee. Samples have been analyzed at laboratories at the University of Georgia and the University of Tennessee. Cultivars included in this phase are: Chardonnay, Cabernet Franc, Cabernet Sauvignon, Merlot, Vidal Blanc, Viognier, Touriga, Sangiovese, Norton (Cynthiana), Pinot Gris and Sauvignon Blanc. Participating vineyards are: Montaluce, Three Sisters, Cavendar Creek, Wolf Mountain, Blackstock, Bill Stack Greg Olson, MREC at Blairsville (all from Georgia) and from HRH Vineyards in Tennessee.

Future Plans: Petiole samples will be collected from vineyards in Georgia, North Carolina and Tennessee at full bloom. Attempts will be made to utilize the same vineyards and cultivars as those already sampled. Additional samples will be collected at veraison from vines where shoots have not been headed and from vines that have been topped to ascertain differences.

A final report will be made in Fall 2011.