ABSTRACT

Title: Development and Evaluation of Crown Gall-Free (Agrobacterium vitis) 'White Riesling', 'Chardonnay' and 'Cabernet franc' Grapevines

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A frequent and devastating secondary effect of winter injury to grapevines is the development of the disease known as Crown Gall. To combat this problem, this project has developed Crown Gall-free grapevines. Beginning about six years ago, tissues were cultured and grown into full-sized grapevines, which were planted in a remote, viticulturally-virgin site at SWMREC for the first time in 2004. These special grapevines will be used to research important questions. How long can these grapevines remain free of this disease when planted on old and new vineyard sites? Will the absence of Crown Gall in these grapevines greatly reduce the impact of winter injury on relatively cold tender wine grape varieties? Thanks to funding from the USDA Viticultural Consortium, the Michigan Grape and Wine Industry Council and the MSU Agricultural Experiment Station this work continues.

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Final Report

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1. OBJECTIVES:

(1) To develop propagation material of the wine cultivars 'White Riesling', 'Chardonnay' and 'Cabernet franc' and the rootstock Couderec 3309 that is indexed to be free of the pathogen *Agrobacterium vitis*.

(2) To evaluate the performance of the above-mentioned propagation material over a 5-year period in several eastern U.S. viticultural regions.

2. TIME PERIOD FOR REPORT: 10/1/2003 to 9/30/2004
This is year 6 of a 15 year study.

3. WORK ACCOMPLISHED:

Vines of Cabernet franc were shoot tip cultured in 1999 in the laboratory of Dr. James Hancock. They were derived from hardwood cuttings purchased from the Foundation Plant Material Services in Davis, California where these tissues had been repeatedly indexed for several grape viruses. Vines from this propagation were grown in the greenhouse for 1999 and planted in a mother vineyard at the Southwest Michigan Research and Extension Center in the spring of 2000 after the site had been prepared with soil fumigation. Hardwood cuttings from those vines were sent to Dr. Thomas Burr at the NYS Geneva Experiment Station in December, 2000 for crown gall indexing. That indexing procedure was performed during the spring of 2001. The results were negative from tissues of 42 vines in the mother vineyard.

Hardwood cuttings of Chardonnay, Riesling and the Couderec 3309 rootstock were obtained from the Foundation Plant Material Services in the spring of 2000. Similar to the above, vines were shoot tip cultured from these cuttings and grown in the greenhouse through the 2000 growing season and the 2000-2001 winter. They were set out in the SWMREC mother vineyard in June, 2001.

Bench grafting equipment was purchased in 2001. Procedures for bench grafting of the tissues in this project were developed in 2002 while the vines of Cabernet franc, Chardonnay, White Riesling and C3309 rootstock gain in size in the SWMREC mother vineyard.

Bench grafting of grapevine material other than those in this project was performed in 2002 to develop the methods for this work. Callousing procedures worked well. There was approximately 60% success of 300 vines grafted in a nursery. In December 2002, hardwood cuttings from all vines developed in this project were sent to Dr. Thomas Burr for Crown Gall indexing. The population of vines in this Crown-Gall free mother vineyard now includes: 42 vines of Cabernet franc; 15 vines Couderec 3309; 10 vines Chardonnay-clone 95; 10 vines Chardonnay-clone 75; 10 vines Chardonnay-clone 277; 9 vines White Riesling-clone 198. Indexing of these vines for A. vitis in 2002 was negative for all vines. Cuttings of all vines were made in December, 2003 and sent to Dr. Tom Burr at the N.Y.S. Geneva Experiment Station for crown gall indexing. Indexing of old vines was once again negative. Due to limited rootstock material, propagation was not possible in 2003. However, in December, 2003 approximately 500 cuttings of the C3309 rootstock were harvested and stored for grafting in 2004. Budwood of the C franc variety was also harvested and stored. Bench grafting with these tissues in May, 2004 was highly successful with more than 95% success. Vines were planted in a viticulturally-virgin site, which had been fumigated prior to planting. Vines were dug, bundled and stored in December, 2004.

4. SUMMARY OF EXPENDITURES:

Labor	$4,681.05
Materials	$ 543.95
Total	$5,225.00

5. RESULTS:

We now have for the first time bench grafted vines that were indexed to be free of Agrobacterium vitis. This allows us to begin field experiments with these vines to determine if they can provide a reduced impact of winter injury to grapevines grown in a cool climate.

6. COMMUNICATIONS ACTIVITIES:

1. Presentation to growers at Northwest Orchard and Vineyard Show - January, 2004.

2. Presentation to growers at 14th Annual Viticulture Field Day - July, 2004.

3. Presentation to growers at Great Lakes Expo - December, 2004.

4. Article published on the MSU Southwest Michigan Research and Extension Center website - http://www.msue.msu.edu/swmrec

7. FUNDING PARTNERSHIPS:

USDA Viticultural Consortium Grant