NGWB GRANT FINAL REPORT

Contract Number: 18-13-198

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Issue of Interest: The overall goal of the University of Nebraska Viticulture Program (UNVP) is to provide science-based research information that will assist the development of the Nebraska grape and wine industry in a sustainable and profitable manner, thus enhancing the economic viability of Nebraska communities. Improving performance of grapes grown in Nebraska vineyards leading to excellent quality wine production is part of this goal. Evaluation and selection of grape cultivars and their efficient management in Nebraska vineyards, along with educational programs that add to the overall capability of grape growers and winemakers are also included in this overall goal.

Approach to Problem: Research vineyards managed by the UNVP and those of grower-cooperators are employed for scientifically designed and implemented research projects. These experiments are underway and have yielded results that are communicated to the Nebraska grape and wine industry by a variety of educational methods, including workshops, field days, the Annual Nebraska Winery and Grape Growers Forum and Trade Show and by electronic means such as the Nebraska VineLines newsletter and the UNVP website.

Goals/Achievement of Goals: Cultivar and genotype evaluation of over 80 different genotypes has led to recommendations helpful to growers starting new vineyards or adding to existing vineyards. It is as helpful to know **what not to grow** as it is to have a list of recommended cultivars. Additionally, canopy and overall vineyard management research has led to further recommendations helpful to growers, especially with regard to trellis selection and canopy management. M.S. student C. Bavougian has published recently on the latter subjects (see Results section).

The **NE-1020** collaboration has begun to bear fruit, in that results are being shared among the university and research specialists working on the same grapes in several other states. Because this project is still relatively new and ongoing, results are only preliminary, but already helpful to the Nebraska industry. More results are expected to be achieved over the next 3 to 5 years.

Bud-break delay has been accomplished by use of hormonal and oil treatments of the buds during the winter months. PhD student Issam Qrunfleh has developed two publications resulting from this part of the project (one published in 2013) in addition to his PhD dissertation (see Results section).

Field Days, other educational programs:

- July 28, 2012, Disease Management, Sprayer Technology and Ozone Technology Field Day (over 50 in attendance).
- November 3, 2012, Herbicide Drift Workshop, including use of a webinar approach to reach participants from the Northern Grapes Project. This topic was selected as a result of significant damage to the NE-1020 planting at Dove Landing vineyard. Measurable differences in susceptibility among cultivars in the NE-1020 vineyard were reported at this workshop by UNVP personnel.
- February 28-March 2, 2013, 16th Annual Nebraska Winery and Grape Growers Forum and Trade Show, Kearney, NE (over 150 in attendance). Evaluations by attendees of the topics presented, e.g., winemaking practices, viticulture fundamentals, cultivar selection, vineyard floor management, worker protection standards, reduced input grape production and the herbicide drift round table were all rated good to excellent. Respondents indicated an increased knowledge after these sessions, that is, they noted higher ratings of their knowledge "after" than "before".
- March 30, 2013, UNVP personnel participated in a field day organized by the Nebraska Winery and Grape Growers Association (NWGGA) focusing on use of vegetable oil and hormonal sprays to delay bud break. Sprayer adaptations were demonstrated at the Eric Nelson vineyard following the classroom discussions held at James Arthur Vineyards.
- May 11, 2013, Ground Covers, Mulches, Weed Management, Organic Viticulture and Community Supported Agriculture were the topics of focus at this field day held at Fox Run Farms, Brainard, Nebraska. Attendees were overheard to say that this was "just what they were looking for" and several indicated that they will implement use of creeping red fescue as a ground cover rather than use herbicides under the vine row.
- Throughout the year, several issues of the Nebraska VineLines (NVL) were transmitted to the NVL mailing list. The NVL is now sent by email, which allows more spontaneous communication on timely topics when they emerge, for example announcement of Northern Grapes Project webinars. This approach has led to quicker feedback from recipients, including several who expressed their appreciation that the NVL had "gone electronic".

Results, Conclusions, Lessons Learned: Extremely useful results have been achieved that will be of benefit to the Nebraska grape and wine industry. A few key observations follow:

- Canopy management. From the aforementioned UNVP research it is clear that a high cordon trellis system, especially the Geneva Double Curtain (GDC), is the preferable system for Frontenac and probably other grape cultivars with vigorous and/or pendulous growth habit. (Bavougian, Christina, Paul E. Read, Vicki L. Schlegel and Kathryn J. Hanford. 2013. Canopy light effects in multiple training systems on yield, soluble solids, acidity, phenol and flavonoid concentration of 'Frontenac' grapes. HortTechnology 23:1-7.)

- Cold hardiness evaluation and cultivar growing degree days (GDD) studies. Both of these topics were reported at the 16th Forum and although it will be necessary to acquire and analyze more data, preliminary results are being used in discussions with growers. (Qrunfleh, Issam and Paul E. Read. 2013. Use of naphthaleneacetic acid and vegetable oil to delay bud break in 'Edelweiss' single-bud grapevine cuttings placed in a forcing solution. Intl. J. Fruit Science 13:400-412).
- NE-1020 Project. Because of extreme herbicide drift damage to the cultivars and genotypes being evaluated at the UNVP planting on a commercial vineyard (Dove Landing Vineyard), only limited data were obtained from the compromised grapes in that planting. Harvested fruit samples were analyzed by the enology lab at Iowa State University and will form the basis of a partial evaluation of the genotypes in this research project. However, a positive aspect of what was a rather devastating blow to this project was accomplished by rating the relative susceptibility of the grapes in this trial. Preliminary data were summarized and presented at the 16th Forum; more complete analysis will be presented in July at the Annual Conference of the American Society for Horticultural Science and the meeting of the American Society of Enology and Viticulture, Eastern Section.
- Cultivar Selection. Several cultivars being tested In the UNVP research vineyards and the NE-1020 trials have been identified for consideration of planting on a trial basis, including Delaware, Geneva Red, Norton/Cynthiana, Noiret, Corot Noir, Bianca, Riesling, Esprit, Aromella, Arandell, MN 1200, MN1220, Trollhaugen and Vignoles, while several *Vitis vinifera* cultivars and Valvin Muscat have not been acceptable. To obain specific details and recommendations for these and other genotypes tested by the UNVP, contact Paul Read (pread@unl.edu, 402-472-5136).
- Ground covers and mulches. Our studies have shown that prairie hay, black landscape fabric, crushed glass and distillers dried gains offer promise as mulches when applied under the vine row. Creeping red fescue and native grassy vegetation are proving to be suitable options for between-row ("alleyway") installations.

Progress Achieved According to Outcome Measures: The Nebraska grape and wine industry and the industry in the Midwest is benefitting from the UNVP research and educational programs. The Nebraska industry has grown from only one winery and perhaps 10 to 15 acres of commercial grapes in 1994 to its present 28 wineries and an estimated 400 acres or more of commercial grape vineyards in Nebraska. Many of the grape growers and winery start-ups have done so based at least in part upon science-based recommendations from the University of Nebraska Viticulture Program. The collaboration with the NWGGA has been synergistic, in that the collaboration has led to improved communication with growers and winemakers, while gaining feedback that continues to stimulate research and educational programming based upon expressed needs of the industry. Recommendations of cultivar and site selection; trellis system selection and construction; disease and other pest management and vineyard floor management, including mulches and ground covers are a few examples of information contributing to a sustainable, vibrant and growing grape and wine industry in Nebraska.

Financial Report

The budget submitted in the request for funding and included on the contract (18-13-198) has been followed, with only slight changes. Support for the Viticulture Technologist's half salary and benefits enabled delivery of educational programs and exceptional maintenance of the UNVP research vineyards. Expenditures for supplies, fuel and vehicle rental were as noted in the contract, but no expenditures for planting stock and drip irrigation were made (budgeted for $180 and $300, respectively). These funds were instead used for additional trellis materials to replace broken posts (original line posts were landscape timbers that have rotted at the ground level because of age – 14+ years).

The usual 10% overhead charge mandated by the University of Nebraska and per agreement with the Nebraska Department of Agriculture was $4,887.

Additional specific details of expenditures can be provided if desired.