Weed Management in Establishing an Organic Wine Grape Vineyard

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Introduction

In 2008, we initiated a new organic wine grape research study at WSU Mount Vernon Northwesten Washington Research and Extension Center (NWREC). The study has two objectives: 1) conduct a trial of organic and sustainable methods for weed management in a newly established wine grape vineyard that is in transition to organic certification; and 2) establish a replicated organic wine grape block for future research in organic wine grape production.

Weed management in new wine grape vineyards was identified as a primary constraint to organic production in the region by representative area grape growers. Hand weeding is labor intensive and costly and there are no effective, affordable organic herbicide options. There have been no studies on organic vineyard management in western Washington, although a recent bulletin (M. Olmstead, 2006) on cover crops as a vineyard floor management strategy in central Washington contains information relevant to organic vineyards. Organic weed management studies in Washington orchards were conducted by D. Granatstein *et al*. (2006) and various techniques may be applicable to vineyards.

Summary of Research Methods

This study is being conducted on 3 acres of transition to organic land at WSU Mount Vernon NWREC and will be certified organic in 3 years (2011). The experiment is arranged in a split-plot randomized complete block design with three replicates. The main plots will be two wine grape cultivars commercially significant in the area: Pinot Noir Precoce (PNP) a red wine cultivar; and Madeleine Angevine (MA) a white wine cultivar. Both cultivars will be grafted on the rootstock Couderc 3309. The split plot will be weed control treatments:

1) standard/current control – practices for organic vineyard management which includes high mowing in alleys and under vines in early April, till and rotovate under vines in mid April, harrow if needed for quackgrass control; periodic disking between rows as needed; hill in late June or early July; disk, harrow and hill again if weedy in late August;
2) standard control treatment but using the “Wonder Weeder”;
3) standard control treatment plus a small grain cover crop seeded throughout the plot in late August each year;
4) standard control treatment plus 1:1 small grain:legume cover crop seeded in fall;
5) standard control treatment plus 2:1 small grain:legume cover crop seeded in fall.

Each plot has 5 (PNP) or 4 (MA) rows with 14 plants per row. Data will be collected from 10 plants in the center 3 (PNP) or 2 (MA) rows in each plot. Total number of plants will be 1,946; To ensure that the newly established organic wine grape research block will be suitable for future organic wine grape research, plots size was planned to produce a minimum of 5 gallons of wine. Five gallons of wine is the minimum quantity needed for wine research as determined by WSU viticulture specialists. In addition, two varieties that are the two most common red and white grape

varieties grown in the region are included in this study to ensure that the research block will be relevant for future studies.

To fine-tune the weed management treatments prior to planting the large replicated field experiment, a non-replicated pilot test is underway. This study includes 4 treatments with 6 plants per plot, 24 plants in total. Variety Madeleine Angevine on Couderc 3309 rootstock was transplanted July 2, 2008. Treatments include winter wheat, winter pea, and winter wheat + winter pea in 1:1 and 2:1 combinations. Based on how these treatments perform by April of 2009, treatments will be fine tuned in the large research study.

Current Accomplishments

In the pilot test study, the small block was rototilled, grapes were transplanted July 2 2008, and cover crops were seeded July 7. Treatments were planted and included winter wheat, winter pea, and winter wheat + winter pea in 1:1 and 2:1 combinations. There are no results from this test plot at this time. For the replicated field experiment, the field was planted with small grains in 2008 to reduce weed pressure, increase soil organic matter, and optimize soil nutrients. PAR-4 9-3-7 organic fertilizer was applied at the rate of 10.8 lbs N/A and untreated barley was planted in June 2008. Barley grain was harvested in August and crop residue was tilled into the soil in September. Annual rye was planted in November and will be tilled into the ground in spring 2009. Soil samples were collected in April and October, and organic amendments are being made according to the test results.

Two cultivars, Pinot Noir Precoce and Madeleine Angevine grafted on the rootstock Couderc 3309, were ordered from a commercial supplier (October 2008) and will be transplanted to the field in May 2009. A Wonder Weeder was purchased from Harris Manufacturing located in Burbank, Washington. We will evaluate its ability to safely and effectively remove weeds between vines, sprinklers, and trellis posts, as well as processing weeds into green manure. We are collecting information regarding organic grape trellising systems (e.g. treated wooden posts are prohibited) as well as irrigation systems and these will be installed in the field in spring 2009.

Data collection will begin in summer 2009 and will include vegetation sampling (counts, percent ground cover, and dry biomass) of major weed species and cover crops in whole plots during Year 1, and in alleyways and under vines (separately) in Years 2 and 3. Annual measurements of grapevine growth will be done in the fall of Years 1 and 2, and will include number and length of current-season shoots, trunk diameter, bud number, mean internode length, and pruning biomass. Costs will be calculated for each weed control treatment including equipment, labor, and supplies. An M.S. student has been recruited for this project and will begin course work in January 2009.

Grower Survey

To better understand the current status of wine grape production and issues in Western Washington, we conducted a survey of wine grape producers in the region. We found that the number of wine vineyards has increased from 5-10 in 2000 to 50 in 2008. A significant number of these growers are intending to utilize organic practices and thus information from this study will enable them to achieve their goal of sound and sustainable weed management methods suited to local soil and climate conditions.

Grower Advisors

A wine grape advisory group of five representative growers from NW Washington was formed in 2008. This group has met several times to discuss and prioritize research needs, to determine the management strategies to be tested in this study, and to raise funds for the wine grape research program and this project in particular. At the first meeting, weed management in new wine grape vineyards was identified as a primary constraint to organic production in the region. The grower advisors include Tom Thornton, Cloud Mountain Farm (cloudmt@telebyte.com, 360-966-5859), Brent Charnley, Lopez Island Vineyards & Winery, (winery@lopezislandvineyards.com, 360-468-3644), Chuck Jackson, Eagle Haven Winery, Karen Pierolo and Richard Hughes, Acapella Vineyards, and Randy Bonaventura, Challenger Ridge Winery.

Project Funding

Funds for this project were raised from several sources, including WSU Center for Sustaining Agriculture and Natural Resources (CSANR), Washington Wine Advisory Board, and Northwest Agriculture Research Foundation (NARF). While the WSU CSANR granted funds for three years, funds for Year 2 will likely not be forthcoming as these are earmark funds and Congress is not likely to allocate these funds in 2009. Funds raised by local growers (NARF) play an extremely important role in the continuation of this project as they provide the foundation for all other funds that we are able to secure. If you are interested in contributing to the NARF grower research fund, please contact Tom Thornton or Brent Charnley (see contact information above).

Literature Cited

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