CFAES

The Ohio State University Viticulture & Enology Team

Ohio Grape-Wine Electronic Newsletter

Edited by: Dr. Maria Smith

September | 2018

Harvest Day, Photo credit: Diane Kinney, OARDC, Wooster, OH, Sep 2018

IN THIS ISSUE:

Best wishes for the 2018 harvest

Thanks to hurricane remnants and unseasonable temperatures, September has provided us with unfavorable harvest conditions across the state. This has made fruit rots, late-season foliar disease management, and other harvest decisions particularly difficult.

In this issue of OGEN, we address some of the current topics our team has encountered over the past month, including grape pricing, late-season fruit rot management, and wine labeling requirements, as well as continued grape maturity tracking for harvest decisions.

As we make it through this harvest stretch, we want to wish everyone the best in continuing to tackle many of these challenges we face now and in the coming month.

- Maria and the OSU V&E team

2018 Ohio grape pricing initiative

By: Dr. Maria Smith, HCS-OSU

Reasons to establish a grape price index for the Ohio wine grape industry

Generating an aggregated pricing index for Ohio-grown wine grape varieties can help towards guiding profitability, and here's how:

- **Ensure growers are not missing out on profits compared to regional and national pricing trends**
- **Provide accurately estimated revenue loss for vineyard insurance claims**
- **Understand long-term trends in Ohio grape prices**
- **More precisely estimate how grape prices might change with various vineyard management practice use**

How can we value Ohio grapes?

As the wine industry in Ohio continues to grow, grape supply must rise in order to meet winery demands. One of the major challenges towards achieving this is ensuring profitability for wine grape production. Generating an aggregated pricing index for Ohio-grown wine grape varieties can help towards guiding profitability.

Over the past month, I have spoken with a number of growers about how to price wine grapes in order to maintain profitability. However, the answer is not straight-forward. There are many factors that need to be considered based on vineyard costs (i.e., labor, materials [1]), potential yield estimates, and the buyers' willingness to pay at a specific cost. Furthermore, there are larger economic considerations of regional variety supply and demand that will dictate grape prices.

Implementing vineyard management strategies that may promote higher quality grapes can come at a steep cost [2,3]. These costs may be difficult to recover and economically unsustainable depending on the market value of that variety, perceived grape and wine improvements, and the ability to use the grapes for estate wine as a value-added product. Some cost recovery may be calculated into wine grape pricing (**Table 1**); however, with lower value varieties, full cost recovery is often difficult [3].

Currently, Ohio does not have a pricing index that helps growers determine the value of their grapes. The only known pricing index by variety for the Eastern US is the Finger Lakes Grape Price list (FLGP 2017). If there are other regional indices you know about, please let me know! Based on my observations, I do not feel that this price index accurately reflects the grape prices attained in Ohio, which, in part, is why we are working to gather price information from growers across the state. ***In the coming months, OSU viticulture extension will be seeking industry responses to derive average grape prices by variety and region (Northeast, Northwest, Southwest, Southeast, and Central). Specific grower data will be kept confidential, with summarized results published for Ohio industry use.***

References:
[1] Yeh et al. 2014. Cost of establishment and production of *V. vinifera* grapes in the Finger Lakes Region of New York-2013. Cornell University Department of Applied Economics and Management, Ithaca, NY.
[2] Preszler et al. 2012.Cluster thinning reduces the economic sustainability of Riesling production. Am J Enol Vitic. 64:333-341.
[3] Sun et al. 2012. Impact of shoot and cluster thinning on yield, fruit composition, and wine quality of Corot Noir. Am J Enol Vitic. 63:49-56.

Table 1 *Estimating production costs. Modified from Sun et al. (2012)*

	A	B	C	D	E
Vineyard practice	**Additional cost of crop management ($/acre)**	**Additional production cost ($/ton)**	**Yield (ton)**	**Expected revenue ($/acre)**	**Preferred price to maintain max. revenue ($/ton)**
(1) No practice	$0	=A1/C1	8 tons/acre	= C1 * market price	= (D1/C1) + A1
(2) Practice (e.g., shoot thinning)	Added labor cost ($)	=A2/C2	6 tons/acre	= C2 * market price	= (D1/C2) + A2

Research review: Sour rot management

By: Andy Kirk, AARS-OSU

September observations from AARS…

In the Lake Erie and Grand River Valley AVAs, the early challenge of the 2018 harvest has been to achieve fruit maturity while maintaining fruit that is free of late-season rots, most prevalently **sour rot**. This year, as in previous years, the difficulty has been particularly acute with *V. vinifera* Pinot Noir. In my conversations with growers, it is clear that much of the 2018 harvest will be used for rosé and sparkling wine production, as opposed to dry red wine styles. Therefore, the sour rot "disease complex" represents a fundamental management challenge to our industry efforts to produce premium Pinot Noir. The topic of sour rot management warrants continued conversation.

Meghan Hall, an Assistant Research Professor at University of Missouri, recently completed her PhD at Cornell University, where her research efforts focused on the control of sour rot with chemical and cultural practices. Her and her colleagues' efforts in the last five years have shifted the paradigm for many practitioners and researchers alike. Her most recent published work, summarized here, is entitled "Control of Sour Rot via Chemical and Canopy Management" and is available now in the online archives of the American Journal of Enology and Viticulture [1].

What is sour rot?

Sour Rot is a "poorly defined disease-complex" consisting of a multi-stage process, whereby sugar content of a damaged berry is fermented into ethanol by endemic vineyard yeasts, and the resulting ethanol is oxidized into acetic acid by bacteria (**Figure 1**). Past experiments have also concluded that various fruit fly species (*Drosophila* spp.) play a critical role in vectoring fungi and bacteria from place-to-place during the development of this disease-complex.

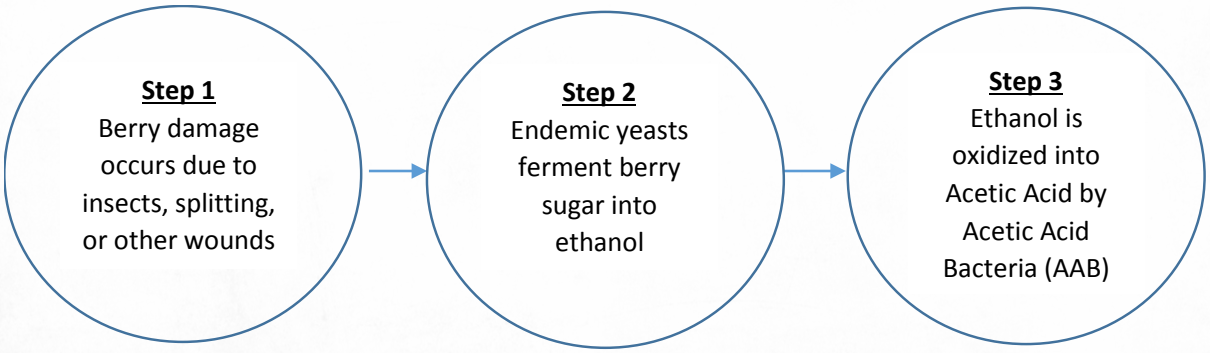


Figure 1 *Three steps in the sour rot formation cycle*

Research review: Sour rot management (continued)

Recent Experiments:

Hall and her colleagues' most recent work focused on chemical control methods to stem the tide of sour rot in a climate like ours, with its high rainfall and humidity during the immediate pre-harvest period. Their experiments tested, alone or in combinations, several late-season anti-microbial spray materials, such as Oxidate 2.0, Potassium Meta-bisulfite, Kocide, and Fracture, with several insecticides including Mustang Maxx and Delegate. All spray treatments were repeated on a weekly basis, with the starting date for each treatment as an additional variable evaluated by the researchers.

Disclaimer and Commentary:

This is a review of recently published research and not a recommendation. Currently, OxiDate 2.0 has yet to be extensively studied for efficacy in grapes. Furthermore, there are also some legal considerations. Potassium Meta-Bisulfite, one of the anti-microbial agents trialed, is not actually labelled for agricultural use in the field. Again on labeled use, *Mustang Maxx may not exceed more than 6 applications per season*, and that the *applications must be at least 7 days apart*. This is to say nothing about resistance concerns either (i.e., population shifts in sensitivity over multiple generations). The label gives a general warning about the potential for insect resistance and the importance of alternating modes of action with insecticide applications. It does not, however, give specific guidelines on the resistance risk of their product with respect to fruit fly species. It is also relevant to note that when a different insecticide, Delegate, was trialed its efficacy was lower for sour rot control than Mustang Maxx.

An interesting, practical question would be whether a different insecticide could be successfully alternated in with Mustang Maxx, both to mitigate long term resistance concerns and possibly reduce costs. Likewise, it would be useful to see an economic analysis as to whether the marginal gain to be had from including anti-microbial products in with insecticide applications merits the additional expense of the anti-microbial product. The research summarized here has increased our collective understanding, but there is more to learn.

Lastly, many growers I have talked with are uncomfortable of the idea of applying insecticide so frequently, so close to harvest. Mustang Maxx has a 1-day pre harvest interval, so the legal side of this is manageable. For our field day this summer, I evaluated the EPA's process for determining safe pre-harvest intervals (PHI) for pesticides. It is a very rigorous process that takes into account the solubility and other chemical characteristics of the pesticide product when determining legal thresholds and restrictions, which should alleviate some concerns. Still, it is understood why the prospect of applying an insecticide right before harvest makes some growers uncomfortable, with, again, the ecological considerations.

References:
[1] Hall et al. 2018. Control of sour rot via chemical and canopy management techniques. Am J Enol Vitic. **DOI:** 10.5344/ajev.2018.17091.

Relevant research results:

- **In all three years, applying a combination of insecticide and anti-microbial materials resulted in significantly improved control of sour rot, at an average improvement of 64% over the control**
- **Application of Mustang Maxx alone (without any anti-microbial material), beginning at 15 Brix, resulted in a 50% improvement in the control of sour rot compared to un-treated fruit**
- **Use of OxiDate 2.0, a commercially available and EPA approved anti-microbial product, resulted in a statistically significant improvement of sour rot control compared with Mustang Maxx alone. An improvement in sour rot control of 69% was achieved over the control when OxiDate and Mustang Maxx were used together**
- **Use of anti-microbial products, such as OxiDate 2.0, without insecticide, provided no significant control of sour rot**

OARDC-Wooster vineyard update

By: Diane Kinney and Imed Dami, HCS-OSU

***Table 1** 2018 harvest fruit composition of selected varieties grown at the research vineyard in Wooster.*

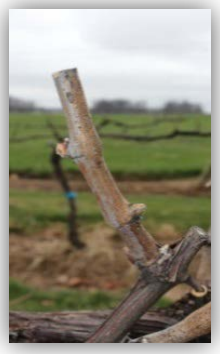
Variety	Harvest date	100 berry weight (g)	Soluble sugars (SS) (%)	pH	Titratable acidity (TA) (g/L)
Chardonnay	21-Sep	158	20.2	3.35	8.4
La Crescent	20-Sep	147	22.3	3.27	12.6
Marquette	18-Sep	150	23.1	3.44	8.8
Regent	7-Sep	200	21.6	3.53	6.3
Sauvignon Blanc	7-Sep	160	21.6	3.33	7.2

Grape Phenology:

What a difference a year makes! Last year the cool and dry weather delayed harvest to allow "hang time" for ideal fruit composition. This year, with a hot and wet September, has been far from ideal. We actually began harvesting in late August and are half way through all varieties. Some of the harvest was "forced" due to breakdown of the fruit (e.g. LaCrescent and Marquette); thus not based on ideal fruit composition numbers (**Table 1**). Cabernet franc, a late variety, is still not ripe yet (20.7 Brix, 3.47 pH, and 8.1 g/L TA as of 24 Sep, **Figure 1 p. 6**).

To learn more about determining fruit maturity and when to pick grapes, check out our factsheet at Determining Grape Maturity and Fruit Sampling, and observe weekly fruit maturity progression at OSU vineyard sites at Weekly Fruit Maturity.

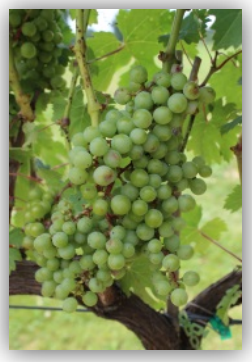
OARDC-Wooster (continued)



Cab franc
28 Apr 2018

Cab franc
29 May 2018

Cab franc
27 Jun 2018



Cab franc
30 Jul 2018

Cab franc
28 Aug 2018

Cab franc
24 Sep 2018

Figure 1 *2018 phenology progression of Cabernet Franc. Photo credit: Diane Kinney*

Weather Conditions

This year, the weather has been simply miserable during fruit ripening (no way to sugar coat it). Heat is usually welcome in September, but not when accompanied with excessive rain fall. Indeed, remnants of tropical storm Gordon, and to a lesser extent, hurricane Florence dumped double the average rain in September at the worst time possible for grapes. Typically, we receive about 2.5" of rain in September, but we are already at nearly 5" as of 24 Sep, resulting in a whopping 8.92" over the 30-year average at this time of year. Mean temperature in September is also above the 30-year average resulting in higher heat units than normal at 3058 GDD. Let's hope the rain stops in next few days or weeks to allow for better fruit ripening conditions in late varieties…

Cultural Practices

The combination of rain and mechanical fruit damage (by varmints and wasps) has resulted in significant rot incidence, especially in thin-skinned white varieties. Canopy management practices have definitely helped minimize disease infection, but we have not avoided it altogether. We are ready for hilling-up grafted vines.

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Guidelines for wine labeling

By: Patrick Pierquet and Todd Steiner, HCS-OSU

The Beverage Alcohol Manual (BAM):

A Practical Guide

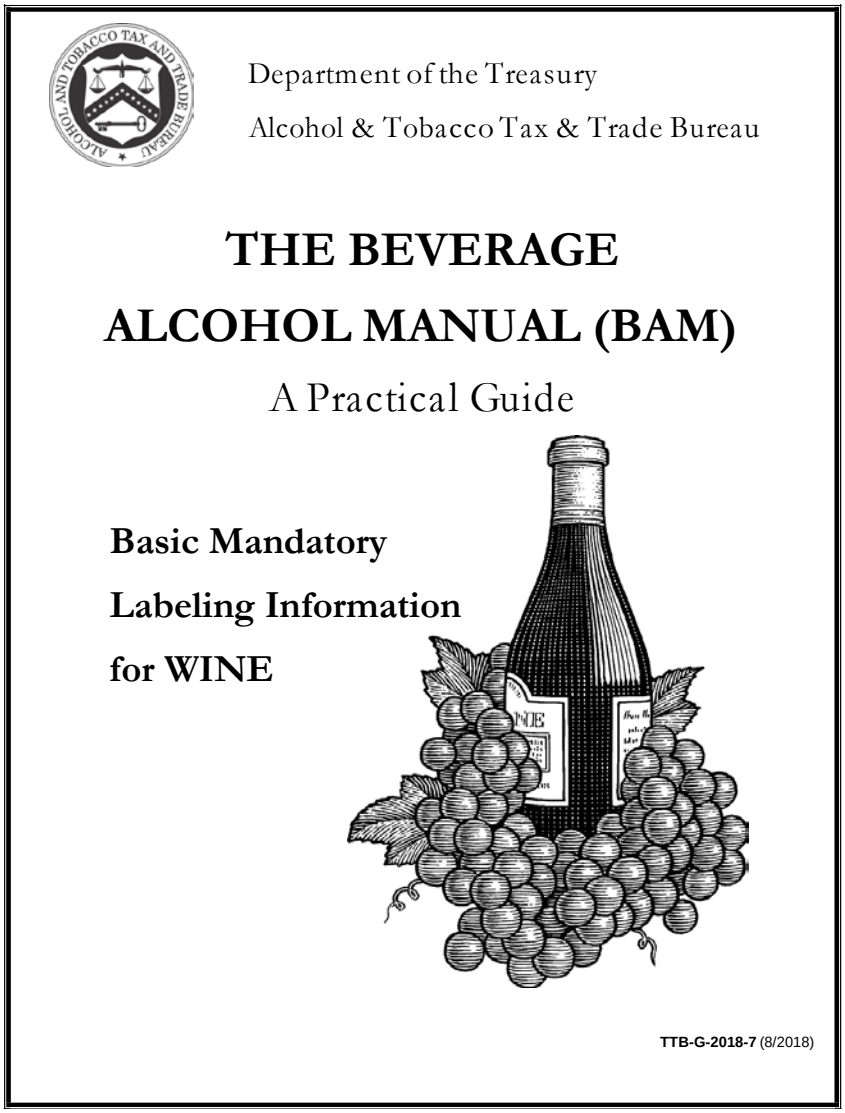
Basic Mandatory Labeling Information for WINE

Updated: 10 Aug 2018

Can be downloaded from: https://www.ttb.gov/wine/bam.shtml

The office of Alcohol and Tobacco Tax and Trade Bureau (TTB) has recently republished the Wine Beverage Alcohol Manual (BAM). BAM was prepared to assist the wine industry in understanding the main requirements for wine labeling. Instead of having to go through dense regulations written in "legalese," the BAM is intended to be used as a guide to help with label issues. According to the TTB: "This manual is not intended or designed to be a comprehensive compilation of all the labeling regulations, rulings, and requirements set forth elsewhere in the CFR or in other TTB publications. Please keep in mind that the presence of certain information on a label may trigger other labeling requirements or may violate labeling regulations not listed in this guide." ***For access to all TTB regulations that apply to wines, visit: https://www.ttb.gov/wine/***

Note: Please keep in mind that the wine label needs to be registered with the Ohio Division of Liquor Control in addition to other potential criteria to be met. More information can be found at the Division of Liquor Control website: https://www.com.ohio.gov/liqr/ regarding label registration, winery production/manufacturing , tasting permits, etc. in operating as a bonded winery (A-2) permit holder in Ohio. Their phone number is 614-644-2360.



Department of the Treasury

Alcohol & Tobacco Tax & Trade Bureau

THE BEVERAGE ALCOHOL MANUAL (BAM)

A Practical Guide

Basic Mandatory Labeling Information for WINE

TTB-G-2018-7 (8/2018)

Processing options and sulfur dioxide management for rot compromised fruit

By: Todd Steiner, HCS-OSU

Other processing steps to take with higher than desired rot levels arriving in the cellar:

- **Whole cluster pressing (white varieties)**
- **Use of lysozyme in protecting against gram positive bacteria**
- **Juice clarification**
- **Evaluate nutritional status of juice/must**
- **Minimal to no skin contact (whites) or cold soak (red) operations and quicker ferments**
- **It may also be beneficial to add some enological tannin (gallic) to the juice/must, which is thought to help bind laccase. If malolactic fermentation (MLF) is desired, it is recommended to complete this as rapidly as possible**

With higher amounts of rainfall and increased disease pressure during the 2018 harvest, it is important to monitor fruit conditions both in the vineyard and coming into the cellar for vinification. Higher levels of oxidative yeast such as *Candida*, *Hanseniaspora* and *Pichia* in addition to Acetic acid bacteria (*Acetobacter* and *Gluconobacter*) are of concern in the winery. Higher levels of *Botrytis* containing tyrosinase and laccase can also be present, causing a concern in browning and oxidation reactions along with increased levels of glucan that can make wine difficult to filter. Once harvested, it is recommended to cool the fruit down in a cooler (if possible, depending on winery setup) between 35 to 40°F to knock down the microbial activity occurring on the fruit.

In addition to sorting in the vineyard, it is good practice to sort out any missed, damaged, or rotten fruit in the cellar prior to crushing. High density populations of wild yeast and bacteria may represent additional contamination threats for microbial problems during primary and secondary fermentation and wine storage.

Although the preventative measures (see: left) are recommended in the processing of unsound fruit, ***it is extremely important to add increased amounts of sulfur dioxide (SO_2) to the must/juice to help prevent microbial and chemical spoilage of wine during fermentation and storage.***

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Processing options and sulfur dioxide management (continued)

The following information provides some good guidelines on the use of SO_2 at crushing (**Table 1**) adapted from a previous OGEN post by Dr. Jim Gallander. Be mindful that wine style and fruit temperature are two other factors used in determining SO_2 addition rates. Their descriptions are as follows:

Wine Style

One example is the encouragement of malolactic fermentation, which requires sound fruit at low amounts of SO_2 (< 30 ppm) and pH values above 3.10. As mentioned in the side bar, grapes containing higher than desired levels of rot should have malolactic fermentation (MLF) occur as rapidly as possible, so that appropriate levels of SO_2 can be added to the wine, based on pH, to protect both chemical and microbial issues arising during the cellaring process.

Fruit Temperature

A common practice of the best wineries is to harvest very early in the morning (4:00 AM) to ensure cool fruit temperatures. Comments from winemakers suggest a recommended range (50 to 60°F) for high quality wines.

Table 1 *Typical amounts of sulfur dioxide (SO_2) added at crushing based on fruit condition.*

Grape condition	pH values	Sulfur dioxide (SO_2) parts per million (ppm)
Sound grapes with average maturity	3.1 – 3.5	30 – 50
Sound grape above maturity	3.6 – 3.8	50 – 80
Unsound grapes, rot, over maturity	3.9 – 4.2	> 80

Processing options and sulfur dioxide management (continued)

To simplify calculations, we have listed below a few common equivalents and conversions (**Tables 2 and 3**), which may be useful in adding the correct amount of SO_2 at different stages of winemaking.

Table 2 *Equivalent values.*

Weight	Volume
1 lb = 16 oz = 454 g	1 gal = 3.8 L = 3790 mL
1 oz = 28 g	1 gal of wine = 8.2 lbs
1 lb grapes = 0.92 * lbs crushed grapes * 0.08 (or 8% loss due to rachises, etc.)	1 gal of juice = (22 Brix) = 9.1 lbs
	1 gal of crushed grapes = 8.9 lbs

Table 3 *Concentration conversions.*

ppm	%	mg/L	Multiplication factor
100,000	10	100,000	0.1
10,000	1	10,000	0.01
1,000	0.1	1,000	0.001
100	0.01	100	0.0001
10	0.001	10	0.00001

Processing options and sulfur dioxide management (continued)

Example

To add 50 ppm SO_2 to 2000 pounds (ton) of grapes, calculate the amount of potassium metabisulfite ($K_2S_2O_5$)

Equation:
Weight of $K_2S_2O_5$ = **Y * Z * 1.72**

Where:
Y = weight or volume of crushed grapes:
2000 pounds of grapes = 1840* pounds of crushed grapes * (0.08 or 8% loss due to rachises, etc.) **OR**
2000 pounds of grapes = 207 gallons of crushed grapes = 787 liters of crushed grapes

Z = multiplication factor for the desired ppm level (**Table 2, p. 10**)

1.72 = multiplication factor to convert SO_2 to $K_2S_2O_5$, $K_2S_2O_5$ contains 58% SO_2

Therefore:
Weight of $K_2S_2O_5$ = 1840 pounds x 0.00005 x 1.72
Weight of $K_2S_2O_5$ = 0.092 pounds x 1.72
Weight of $K_2S_2O_5$ = 0.16 pounds or 72 grams for 1840 pounds or 207 gallons of crushed grapes

Once primary and malolactic fermentation (if desired) are completed, it is important to continue monitoring wines produced from unsound fruit for potential microbial and chemical issues during the cellaring process. ***Limiting the amount of oxygen to these wines is very important, since many of these wines are aerobic in nature***. Keeping cellar temperatures low (50-55°F) will also help reduce the rate of microbial activity from occurring. It is critical to continually monitor SO_2 levels based on wine pH and add as necessary. This should be accomplished throughout the winemaking process until the time of bottling.

Vine & Wines News @ Buckeye Appellation | 2018

By: Diane Kinney, HCS-OSU

Vine & Wine News continues to provide updates on grape growing and wine making in Ohio and elsewhere. These updates will be posted on the program website, *Buckeye Appellation* (BA) at: http://ohiograpeweb.cfaes.ohio-state.edu/.

We would like to invite you to visit the website on a regular basis to help inform you of what our OSU Team has available to you through OGEN, TGE, research updates, events, and news. Our hope is that it becomes a resource you look up periodically. ***So why not bookmark this site today?***

In the month of September, we have posted the following updates. Simply click on the blue link and the desired document will automatically open.

Educational Materials:

- Ohio Grape-Wine Electronic Newsletter (OGEN) on homepage and tab (current issue).
- The Grape Exchange (TGE) on the homepage and tab (latest posting on September 24).

News:

- Fruit Maturity at the OSU-Wooster and AARS-Kingsville
- OSU/USDA Intelligent Sprayer is in commercial production

Announcements

OSU Plant pathology and entomology are seeking a new M.S. graduate student for Spring 2019!

See page 14 for more position details.

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

M.S. Plant Pathology, Graduate Research Associateship at THE OHIO STATE UNIVERSITY- WOOSTER CAMPUS, DEPT. PLANT PATHOLOGY
Anticipated Start Date: Spring 2019

We seek a motivated Master's student to pursue an applied-research project that evaluates the impact of intelligent sprayer technology on the efficacy of pest management in apples and grapes.

Project Information: Diseases and insect pests are a major limiting factor to fruit tree and small fruit production in the eastern United States. To control these pests, fruit growers use an intensive spray program that requires eight to sixteen pesticide applications per season. Currently, the majority of commercial apple and grape growers in the region use air-blast sprayers to apply pesticides, which results in airborne drift, and the exposure of workers and the environment to drifting contaminants. Intelligent sprayer technology offers the first major innovation in fruit production since the air-blast sprayer. Intelligent sprayer technology has the potential to reduce the amount of pesticide used per spray by 50% or more by using sensors to maximize canopy coverage and minimize spray drift. Key objectives of this research project are to evaluate the efficacy of intelligent sprayer technology in managing common diseases and insect pests of apple and grape. The ultimate goal of this project is to increase the efficiency and sustainability of pest management in fruit production.

Desired qualifications: Bachelor's degree in biology, plant pathology, entomology or a related discipline. Applicants with strong communication skills and experience conducting hands-on field work or research are encouraged to apply. Experience driving tractors is desired but not required.

This position is in the Department of Plant Pathology-Wooster Campus and the Graduate Research Associate will be co-advised by Dr. Elizabeth Long, Assistant Professor, Department of Entomology- Wooster Campus. For more information about the M. S. Plant Pathology Graduate Program application requirements and procedures, visit plantpath.osu.edu/gradapply.

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330-263-3849

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THE OHIO STATE UNIVERSITY
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Name & Address	Phone	Email & Website	Area of Expertise & Assistance Provided
Dr. Imed Dami, Professor & Viticulture State Specialist Dept. Of Horticulture & Crop Science 216 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3882	e-mail: dami.1@osu.edu Website: Buckeye Appellation	Viticulture research and statewide extension & outreach programs.
Dr. Doug Doohan, Professor Dept. Of Horticulture & Crop Science 116 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-202-3593	Email: Doohan.1@osu.edu Website: OARDC Weed Lab	Vineyard weeds and control. Recommendation on herbicides.
Dr. Gary Gao, Small Fruit Specialist and Associate Professor, OSU South Centers 1864 Shyville Rd, Piketon, OH 45661 OSU main campus, Rm 256B, Howlett Hall, 2001 Fyffe Ct Columbus, OH	740-289-2071 Ext. 123	Email: gao.2@osu.edu Website: OSU South Centers	Viticulture Research and Outreach in southern Ohio
Dr. Melanie Lewis Ivey, Assist. Professor Dept. of Plant Pathology 224 Selby Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3849 330-465-0309	Email: ivey.14@osu.edu Website: OSU Fruit Pathology	Grape Diseases Diagnostics and Management. Recommendation on grape fungicides and biocontrols. Good Agricultural Practices and Food Safety Recommendations.
Diane Kinney, Research Assistant Dept. Of Horticulture & Crop Science 218 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3814	Email: kinney.63@osu.edu Website: Buckeye Appellation	Vineyard and Lab Manager – Viticulture Program. Website manager for Buckeye Appellation website.
Andrew Kirk, AARS Station Manager Ashtabula Agricultural Research Station 2625 South Ridge Road Kingsville, OH 44048	440-224-0273	Email: Kirk.197@osu.edu	Viticulture Research and Outreach in northeastern Ohio.
Dr. Elizabeth Long, Assist. Professor OSU/OARDC Entomologist 105 Thorne Hall 1680 Madison Avenue Wooster, OH 44691	330-263-3725	Email: long.1541@osu.edu	Fruit and vegetable insects.
Dr. Erdal Ozkan, Professor & Extension State Specialist Food, Agriculture & Biological Engineering Dept, OSU 590 Woody Hayes Drive Columbus, OH 43210	614-292-3006	Email: ozkan.2@osu.edu	Pesticide application technology, Sprayer calibration
Patrick Pierquet, Research Associate Dept. Of Horticulture & Crop Science 220 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3879	Email: Pierquet.1@osu.edu	Wine Cellar Master Enology research, micro-vinification, sensory evaluation, and laboratory analysis
Dr. Lisa Robbins, Research Assistant Dept. of Horticulture & Crop Scienece 218 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330- 202-3543	Email: Robbins.210@osu.edu	Cellar assistant Enology research, sensory evaluation, and laboratory analysis
Dr. Maria Smith, Viticulture Outreach Specialist Dept. of Horticulture & Crop Science 205 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3825	Email: Smith.12720@osu.edu Website: Buckeye Appellation	Evaluation of site suitability for vineyard establishment and all aspects of commercial grape production. Primary contact for Viticulture Extension and Outreach.
Todd Steiner, Enology Program Manager & Outreach Specialist Dept. Of Horticulture & Crop Science 118 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3881	Email: Steiner.4@osu.edu Website: Buckeye Appellation	Commercial wine production, sensory evaluation, laboratory analysis/setup and winery establishment. Todd is the primary research and extension contact of the enology program.