American Society for Enology and Viticulture-Eastern Section

49th ASEV-Eastern Section Annual Meeting
Athens, GA
July 8-10, 2025

Workshop
Changing Climates, Changing Grape and Wine Production Strategies

Email: info@asev-es.org
Website: http://www.asev-es.org/

Conference Overview

Conference Events: Hotel Abacus

Hotel Abacus (295 E. Dougherty Street, Athens, GA 30601)

Tuesday, July 8, 2025

Conference Registration	Ballroom Breezeway	**7:00-7:45 am**
Tour Georgia Vineyards & Wineries	Lobby	**7:45 am-5:30 pm**

Wednesday, July 9, 2025

Conference Registration	Ballroom Breezeway	**7:30 am-5:00 pm**
Welcome and Overview	Ballroom	**8:00-9:00 am**
Student Poster Flash Talks	Ballroom	**9:00-9:30 am**
Break/View Posters	Ballroom	**9:30-10:00 am**
Technical Sessions	Ballroom	**10:00-10:45 am**
Student Presentation Competition	Ballroom	**10:45 am-12:00 pm**
Lunch and ASEV-ES Business Meeting	Ballroom	**12:00-1:15 pm**
Student Presentation Competition	Ballroom	**1:15-3:00 pm**
Break/View Posters	Ballroom	**3:00-3:30 pm**
Technical Sessions	Ballroom	**3:30-4:30 pm**
View Posters	Ballroom	**4:30-5:30 pm**
Oenolympics & Wines of East Reception	Galleria II	**5:30-7:00 pm**

Thursday July 10, 2025

Conference Registration	Ballroom Breezeway	**7:30 am-2:00 pm**
Welcome and Announcements	Ballroom	**8:00-8:05 am**
AEV-ES Award Presentations	Ballroom	**8:05-8:45 am**
Technical Sessions	Ballroom	**8:45-9:45 am**
Break/View Posters	Ballroom	**9:45-10:00 am**
Poster Flash Talks	Ballroom	**10:00-10:15 am**
Technical Sessions	Ballroom	**10:15-11:00 am**
Lunch	Own Your Own	**11:00 am-1:00 pm**
Changing Climates, Changing Grape and Wine Production Strategies	Ballroom	**1:00-5:00 pm**
Grand Awards Banquet	Ballroom	**6:30-9:00 pm**

ASEV-ES Conference Sponsors

(Sponsors are recognized throughout the program.)

Tuesday, July 8, 2025

Tour Georgia Vineyards & Wineries

Tour Coordinators: Nathan Eason, Sarah Lowder, and Phil Brannen, University of Georgia

Meet in Hotel Abacus Lobby	**7:45 am**
Depart for Montaluce Vineyards Vineyard and Winery Tour 9:45-10:45 am	**8:00 am**
Depart for Three Sisters Vineyards Tasting and Vineyard Tour 11:15 am-12:15 pm	**10:45 am**
Depart for Kaya Vineyard and Winery Lunch, Tasting, Vineyard and Winery Tour 12:20-1:30 pm	**12:15 pm**
Depart for Tesnatee River Winery and Meadery Vineyard Tour and Tasting 1:40-2:30 pm	**1:30 pm**
Depart for Yonah Mountain Vineyards Vineyard and Winery Tour and Tasting 2:50-4:00 pm	**2:30 pm**
Depart for Hotel Abacus	**4:00 pm**
Arrive at Hotel Abacus	**5:30 pm**

Wednesday, July 9, 2025

Welcome 8:00-8:15 am

Moderators: Aude Watrelot, Iowa State University/ASEV-ES Chair and Nathan Eason, University of Georgia/ASEV-ES Chair Elect

Overview of Viticulture and Enology in Georgia 8:15-9:00 am

Nathan Eason, Sarah Lowder, and Phil Brannen, University of Georgia

Student Poster Flash Talks (3 minutes each) 9:00-9:30 am

Vineyard Nitrogen Management: Impacts on Chardonnay Grape Chemistry Characteristics in Virginia
Valeria P. Araujo, Marlon F. Ac- Pangan, Dana Acimovic, Drew Harner, and Amanda C. Stewart*

Impact of Different Strains of *Lachancea thermotolerans* Yeast on Acids and Sugars during Chambourcin Wine Fermentations
Amanda J. Fleming and Renee T. Threlfall*

Assessment of Vine Spacing and Vertical Division on Yield and Quality of Medium and High-Vigor Muscadines
Bijaya Ghimire, Shane Breeden, and Sarah Lowder*

Differential Responses of Petite Pearl and Marquette Grapevines to Cold Stress in Protected and Open Field Systems
Amin Khan and Harlene Hatterman-Valenti*

Heritability of Fruit Quality Traits in a Population of Cold-Hardy Grapes
Elizabeth F. Krause, Avery Shikanai, Andrej Svyantek, and Harlene Hatterman-Valenti*

Validation of A New Method for Tannin Fingerprinting and Quantification via LC-MS/MS and Electrospray Ionization In-Source Fragmentation
Yanxin Lin, Helene Hopfer, Qining Zhang, Sui Qiang, Bruce S. Pan, and Misha T. Kwasniewski*

Chemical Composition of Grape Pomace from Interspecific Marquette and La Crescent Grape Cultivars
Brannigan du Preez and Aude A. Watrelot*

Under-vine Creeping Red Fescue Modifies Vineyard Soil Water Dynamics
Taran K. Rowles, Suzanne M. Fleishman, Donald E. Smith, and Michela Centinari*

Foliar-applied Potassium Sulfate Enhances Cold Hardiness of Hybrid Grapevines
Avery Shikanai and Harlene Hatterman-Valenti*

Grapes Winemaking by Different Yeast Strains
Anamika Singh, Aditya Anand, and Harlene Hatterman-Valenti*

Break/View Posters 9:30-10:00 am

Technical Sessions (20 minutes each) 10:00-10:45 am

Identification of a Novel Powdery Mildew Susceptibility Locus in 'Chambourcin'
Chin-Feng Hwang*, Li-Ling Chen, and Achyut Duwadi

Elucidating the Grape and Wine Microbiome in Spontaneous Riesling Fermentations
Nataliia M. Voloshchuk, **Molly K. Kelly***, Connor I. Gregory, and Josephine Wee

Student Oral Presentation Competition (15 minutes each) 10:45 am-12:00 pm

Haskap Variety and Winemaking Process Evaluations
Aditya Anand, Brent Trella, and Harlene Hatterman-Valenti*

Aromatic Enhancement of Vidal Table Wine Through Increased Volatile Thiol Production
Reid Ball, Debbie Inglis*, and Jennifer Kelly

Tetralone Abscisic Acid and a Multi-Omics Approach for Cold Hardiness in Grape Vine
Rachel A. M. Ciccone and Jim Willwerth*

Cold Hardiness Assessment in *Vitis* riparia and *Vitis amurensis* Mapping Populations Using Differential Thermal Analysis and Phenotypic Clustering
Hava Delavar and Harlene Hatterman-Valenti*

Effects of Foliar Application of Prohexadione Calcium on Cluster Architecture and Post-harvest Bunch Rot of Cold-hardy Interspecific Grapevines
Brooke Dietsch, Sophia G. Schmidt, Xiaochen Yuan, Aude Watrelot, and Suzanne M. Slack*

Lunch and ASEV-ES Annual Business Meeting 12:00-1:15 pm

Student Oral Presentation Competition (15 minutes each) 1:15-3:00 pm

Assessing Color and Phenolics of Wines Produced from Co-fermentation of Noble (*Vitis rotundifolia*) and Merlot (*Vitis vinifera*) Grapes
Amanda J. Fleming and Renee T. Threlfall*

Tannin Fragmentation Fingerprinting Applied: Uncovering the Impact of Oak and Commercial Additives on Wine Tannin Structure
Yanxin Lin, Helene Hopfer, Qining Zhang, Sui Qiang, Bruce S. Pan, and Misha T. Kwasniewski*

Transforming Historical Grape Veraison Data Set into an Online Tool for New York Grape and Wine Industry
Jennifer M. Neubauer, Hongrui Wang, Anna Katharine Mansfield, and Chris Gerling*

Characterization of *Saccharomyces uvarum* CN1 and Its Potential for Rot-Affected Aromatic White Wines
Daniel A. Phillipow, Jennifer Kelly, and Debra L. Inglis*

Evaluating Seven Locally-isolated *Saccharomyces uvarum* Strains for their Capacity to Enhance the Aromatic Profile of Chardonnay Wine
Frédérik Rivard and Debra L. Inglis*

Evaluation of New Perfect-flowered Muscadine Grape Cultivars for Sustainable Production in Alabama
Jagjit Singh, Elina Coneva*, Marlee Trandel-Hayse, Melba R. Salazar-Gutierrez, and Edgar L. Vinson

The Influence of Three Packaging Materials on the Properties of Carbonated Blueberry Wine Under Accelerated Storage Conditions
Nicholas A. Wendrick, Andrew J. MacIntosh, and Katherine A. Thompson-Witrick*

Break/View Posters 3:00-3:30 pm

Technical Sessions (20 minutes each) 3:30-4:30 pm

Exploring Consumer Perceptions of Alternative Wine Packaging: Environmental and Recyclability Impacts
Mark W. Bartz and **Renee T. Threlfall***

Enhancing Phenolic Content in Marquette Wine through the Addition of Stems from Marquette and Itasca Grape Cultivars
Claudia Arriaga and **Aude A. Watrelot***

The Effect of Gibberellic Acid Sprays on Fruit Quality of Cold Hardy Table Grapes
Colin F. Zumwalde, Erin L. Trieber, and Soon Li Teh*

View Posters 4:30-5:30 pm

Adjourn 5:30 pm

Oenolympics & Wines of the East Reception 5:30-7:00 pm

Thursday, July 10, 2025

Welcome and Announcements — 8:00-8:05 am

Moderators: Aude Watrelot, Iowa State University/ASEV-ES Chair and Nathan Eason, University of Georgia/ASEV-ES Chair Elect

ASEV-ES Lifetime Achievement Award — 8:05-8:25 am

Career Highlights in the Grape and Wine Industry

Harlene Hatterman-Valenti, North Dakota State University

ASEV-ES Distinguished Service Award — 8:25-8:45 am

Optimism for Viticulture Extension: Staying Relevant in the Age of AI

Justin Scheiner, Texas A&M University

Technical Sessions (20 minutes each) — 8:45-9:45 am

Resilient Vines for a Challenging Climate: Evaluating Disease-Resistant White Wine Grapes in the Mid-Atlantic
Dana Acimovic and Drew Harner*

Spotted Lanternfly-driven Changes in Grapevine Physiology and Production: Insights from Multiple Studies
Michela Centinari*, Andew Harner, Taran Rowels, Claudia Schmidt, Flor Acevedo, and Cristina Rosa

Pierce's Disease Resistant Grape Varieties: New Implications and Possibilities for the Southeastern U.S.
John W. Nowlin* and **W. Gill Giese**

Break/View Posters — 9:45-10:00 am

Poster Flash Talks (3 minutes each) — 10:00-10:15 am

From Dawn to Dusk: Nutrient Dynamics in Chardonnay and Chardonel Vines
Dana Acimovic, Marlon F. Ac- Pangan, Drew Harner*, and Amanda C. Stewart

Evaluating Methods to Measure Free and Total Sulfur Dioxide in Wine
Amanda J. Fleming, Erika M. Gomez, and Renee T. Threlfall*

Time of Harvest and Grapevine Canopy Management Impact the Aromas in La Crescent and Frontenac blanc Wines
Randall J. Vos*, Erin L. Norton, and William J. Colonna

Cold Hardiness Phenotyping in Hybrid Grapevine Utilizing Differential Thermal Analysis
Douglas Vines, **Colin F. Zumwalde**, Matthew Clark, and Soon Li Teh*

Technical Sessions (20 minutes each) — 10:15-11:00 am

Evaluation of Tissue Nutrient Concentrations in Cabernet Franc Vineyards in Pennsylvania
Cain Hickey*, Michela Centinari, Misha Kwasniewski, and Don Smith

Evaluating Bird Laser Performance and Acoustic Monitoring for Vineyard Biodiversity Assessment
Sarah Ellen Grimes, Bryan C Pijanowski, and **Esmaeil Nasrollahiazar***

Lunch Own Your Own — 11:00 am-1:00 pm

Industry Workshop — 1:00-5:00 pm

Changing Climates, Changing Grape and Wine Production Strategies

Presentations, Interactive Discussions, and Tastings

This workshop has keynote speakers that will address strategies in challenging U.S. grape and wine production areas.

Welcome and Introductions — 1:00-1:15 pm
Moderators: Nathan Eason, Sarah Lowder, and Phil Brannen, University of Georgia

Trends in Grape Variety Purchases — 1:15-2:00 pm
Dennis Rak, Double A Vineyards

Grapevine Winter Physiology, Dormancy, and the Challenge of Changing Climate — 2:00-2:30 pm
Dr. Jason Londo, Cornell AgriTech

From Juice to Wine: Addressing Enological Challenges and Industry Demand — 2:30-3:00 pm
Aude Watrelot, Iowa State University

Break/View Posters — 3:00-3:15 pm

Climate Impacts for the Grape and Wine Industry — 3:15-4:00 pm
Keith Stellman, National Weather Service Atlanta

Climates Trends in Georgia — 4:15-4:30 pm
Pam Knox, University of Georgia Weather Network

Developing *Vitis* x *Muscadinia* Wide Hybrids for Enhanced Disease Resistance and Quality — 4:30-4:45 pm
Renee Threlfall, University of Arkansas

Grapevine Pest Management — 4:45-5:00 pm
Brett Blaauw, University of Georgia

Impact of Changing Climate on Grapevine Pathology — 5:00-5:15 pm
Phil Brannen, University of Georgia

Wrap Up and Adjourn — 5:15-5:30 pm

ASEV-ES Grand Awards Banquet — 6:30-9:00 pm

Workshop Speakers

Brett Blaauw is an Associate Professor and Extension Specialist of fruit entomology with a dual appointment at the University of Georgia and Clemson. He has regional extension responsibilities for a variety of fruits, including grapes. His research and extension programs address southeastern fruit grower needs through a combination of laboratory, research farm trials, on-farm research, and collaboration with colleagues and county extension personnel. Additionally, he tests the efficacy of insecticides against key insect pests of grapes which provides the groundwork for developing pest management recommendations. His work highlights the importance of IPM and the support of beneficial insects for the sustainability of southeastern grape production.

Phil Brannen is a Professor in the Plant Pathology Department at the University of Georgia. He attended the University of Georgia for his undergraduate degree in Plant Protection and Pest Management, where he also received an M.S. in Plant Pathology, followed by a Ph.D. in Plant Pathology from Auburn University. He has extensive experience with disease management programs in numerous cropping systems. He serves as the extension fruit pathologist for Georgia. His efforts are directed towards developing IPM practices to solve disease issues and technology transfer of disease-management methods to commercial fruit producers. He also teaches the graduate level Field Pathology Course, the History of Plant Diseases and their Impact on Human Societies Course, team-teaches the IPM Course, and coordinates the Viticulture and Enology in the Mediterranean Region Course (Cortona, Italy).

Pam Knox is the Director of the University of Georgia Weather Network and an agricultural climatologist in University of Georgia-Athen's College of Agricultural and Environmental Sciences. She has previously served as the Georgia Assistant State Climatologist and Wisconsin State Climatologist as well as in the National Weather Service. She was an author on the 5th National Climate Assessment chapter on the Southeastern United States published in 2023.

Dennis J. Rak is the owner and operator of Double A Vineyards Inc, established in partnership with his wife and sons. Dennis accumulated diverse experience within the agricultural sector. He served as a Greenhouse Manager at Foster Nursery, a Farm Adviser at J. A. Crolle Inc., and a Vineyard Manager at Merritt Winery. He has served as a Director for the National Grape Co-Op since 2010 and assumed the role of President in 2020. Managing a 1,000-acre farm, Dennis oversees 263.4 acres of Concords, with 242.1 acres contracted to National, and 7.0 acres of Niagara, all under National contract. Double A Vineyards cultivates 210 acres of wine and table grapes. The primary business of Double A Vineyards is the sale of grapevines and other nursery stock marketed across the United States. Dennis is a distinguished graduate of Cornell University with a BS and Alfred State College with AAS, reflecting his commitment to education and expertise in the field.

Jason P. Londo is an Associate Professor of Horticulture at the School of Integrative Plant Science, Horticulture at Cornell University. He leads the fruit physiology and climate adaptation program on the Cornell AgriTech campus. His research uses a combination of field, greenhouse, and molecular approaches to understanding the effect of temperature on winter dormancy and cold hardiness physiology, phenology, and growing season fruit ripening processes. Applied science approaches include testing of plant growth regulators, foliar fertilizers and amendments as a mitigation mechanism for stimulating winter acclimation, extending dormancy, delaying budbreak, and reducing fruit quality disorders. Additionally, his program uses transcriptomic and epigenomic approaches to understanding plant acclimation and phenotypic plasticity. Extension activities range from the development of cold hardiness prediction models and associated web-based applications to in depth fruit schools designed for reciprocal knowledge transfer between researchers and growers.

Keith Stellman is the Meteorologist in Charge of the Atlanta National Weather Service Office out of Peachtree City, GA and took over in that role in August of 2012. Prior to coming to GA, Keith was the Warning Coordination Meteorologist in Shreveport LA from 2007-2012, a Techniques Development Meteorologist and Regional Training Officer at the NWS Southern Region HQ in Ft. Worth TX from 2004-2007, A Senior Hydrologist at the Lower Mississippi River Forecast Center in Slidell, LA from 1999-2003, and an intern with the NWS in Tallahassee FL from 1996-1999. Keith received his B.S. in Meteorology from the Northeast Louisiana University in Monroe LA in 1996 where he also played baseball and earning Academic All Conference honors in 1996. Keith graduated in 1999 from Florida State University with a Masters Degree in Meteorology. Keith has been a member of the National Weather Association for 20 years and a broadcast seal evaluator for 11 years.

Renee Threlfall is an Associate Professor at the University of Arkansas System Division of Agriculture (UA System), Fayetteville. She has a split position of 47% research, 35% Extension and 18% teaching at the Department of Food Science At the University of Arkansas, she completed her B.S. in Microbiology and M.S. and Ph.D. in Food Science with an emphasis in enology and viticulture. Dr. Threlfall's research and extension at the UA System is focused on processing and postharvest storage of specialty crops (wine grapes, muscadine grapes, table grapes, blackberries, strawberries, peaches, hops, etc.) and value-added processing of horticultural crops. She has over 40 refereed journal publications. Dr. Threlfall is a member of the American Society of Enology and Viticulture (ASEV), ASEV-Eastern Section, American Wine Society, and American Society for Horticultural Science. Dr. Threlfall is on the Extension and Outreach Committee for the National Grape Research Alliance.

Aude Watrelot is an Assistant Professor of Enology in the Department of Food Science and Human Nutrition at Iowa State University. Dr. Watrelot's research area is fruit, grape and wine tannin and polysaccharide chemistry and their relationship with wine quality. Dr. Watrelot graduated with a PhD degree in Food Science from the French National Institute for Agricultural Research (INRA) and the University of Avignon in France. Following graduation, Dr. Watrelot moved to California both at CSU Fresno and UC Davis to keep conducting research into polyphenol-macromolecular interactions on red wine chemistry. At ISU, she is currently conducting research and has developed Extension programs on understanding viticultural and winemaking practices that could maximize phenolics extraction and improve wine quality. She is currently serving as the chair for the American Society of Enology and Viticulture – Eastern Section (ASEV-ES) and as the vice-president for the Groupe Polyphenols.

2025 ASEV-ES Lifetime Achievement Award

Harlene Hatterman-Valenti
Professor, North Dakota State University

Dr. Harlene Hatterman-Valenti earned her M.S. in Horticulture from the University of Nebraska-Lincoln (1985) and Ph.D. from Iowa State University in Agronomy and Horticulture (1993). She joined North Dakota State University (NDSU) as an Assistant Professor in 2000 and currently is a Professor, Assistant Head, and High-value Crops Specialist. Harlene oversees the grape germplasm enhancement project at NDSU, which released 'Radiant' and 'Dakota Primus'. Her emphasis is weed science, but most research and outreach are production related with cold-hardy grapes. Harlene initiated her grape research in 2001 after the ND state legislature made commercial wineries possible, and currently has four PhD and three MS graduate students with grape research projects. Harlene has been involved with NE2220 (Multi-state Evaluation of Wine Grape Cultivars and Clones) project activities since 2008 and NCCC212 (Small Fruit and Viticulture Research) project activities since 2006. Harlene is the NDSU representative and treasurer on the Executive Board for the North Dakota Grape and Wine Association and has been an ASEV-ES Board of Directors member (2014-2016) and President-elect, President, and past-president (2016-2018). Harlene has sponsored three visiting scholars from Turkey and one post-doc to collaborate on grape research along with numerous past graduate students. To date, Harlene has published 112 peer-reviewed manuscripts, authored/co-authored four book chapters, published 282 scientific abstracts/proceedings, authored/co-authored 43 extension publications, and published 292 research reports. Since joining NDSU, she has given 317 extension presentations.

2025 ASEV-ES Distinguished Service Award

Justin Scheiner
Associate Professor, Texas A&M University

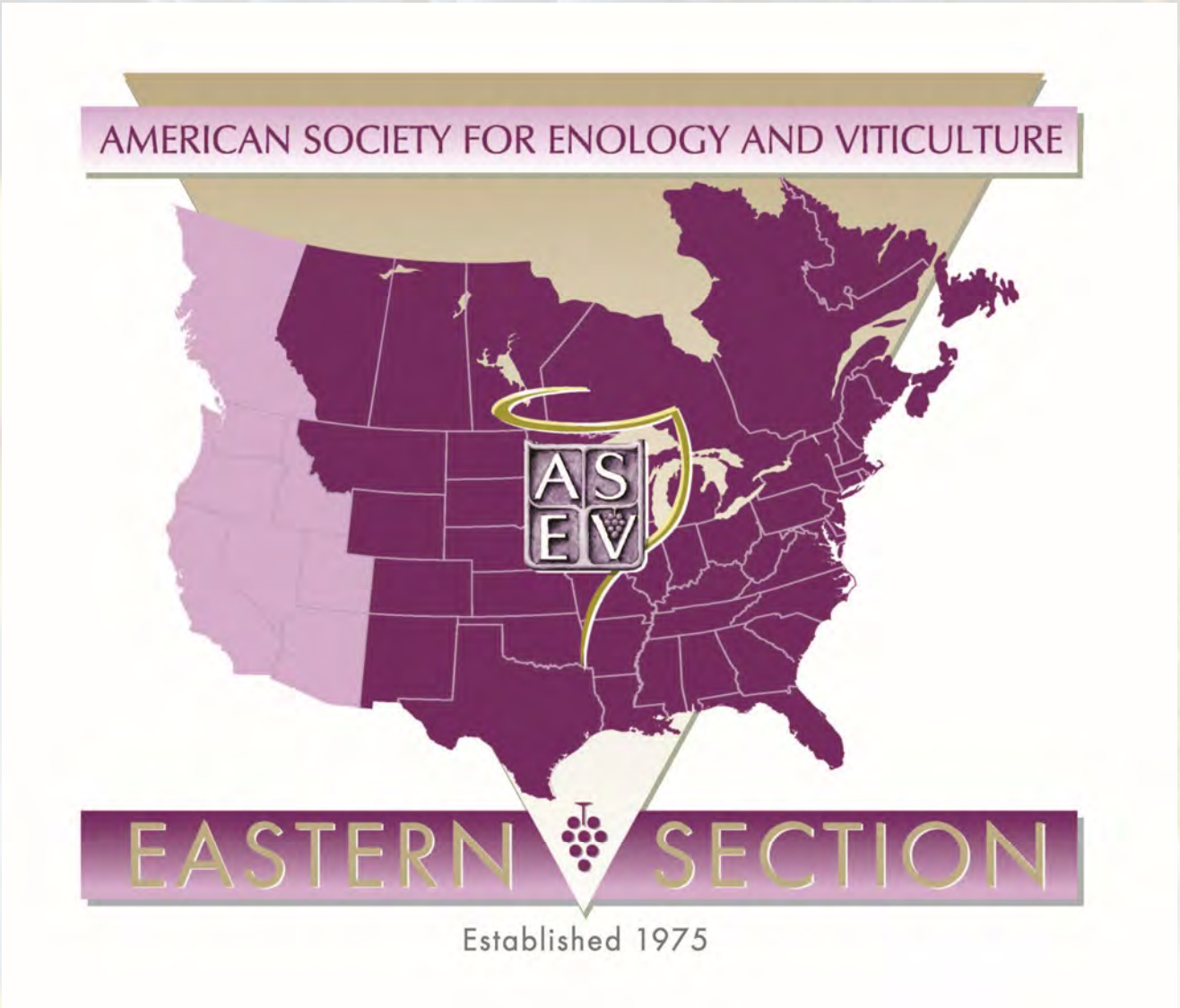
Dr. Justin Scheiner is an Associate Professor and Extension Viticulture Specialist at Texas A&M University and the Texas A&M AgriLife Extension Service. His Extension responsibilities include educational programming and technical support for the Texas grape and wine industry. His research program focuses on best management practices for vineyards in Texas including practices to improve fruit and wine quality, rootstocks and new grape cultivars, cover crops and soil health, and irrigation management. He is a member of the graduate faculty at Texas A&M and he teaches in the Department of Horticultural Sciences

About ASEV-Eastern Section

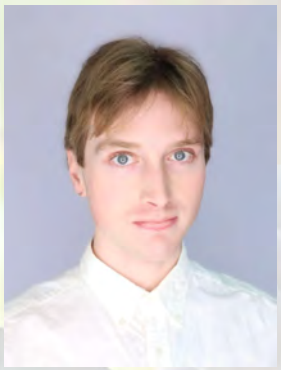
Our mission is to provide forums for the presentation, discussion, and publication of research and technology developments for the advancement of wines and the solution of problems of specific interest to the enology and viticulture of grapes grown in the Eastern United States and Canada.

ASEV-Eastern Section Regions

The ASEV-Eastern Section's geographical area includes all U.S. states and Canadian provinces with territory east of the Continental Divide.



2025 ASEV-ES Scholarship Recipients



Reid Ball, Brock University

Amanda Fleming, University of Arkansas

Yanxin Lin, Penn State University

Daniel Phillipow, Brock University

Taran Rowles, Penn State University

2025 Scholarship Fundraiser Raised over $8,000

The ASEV-ES works every year to raise scholarship funds for students working toward careers in viticulture and enology. ASEV-ES typically awards graduate students a $1,000 scholarship (in addition to conference registration and lodging). Thanks to Eastern Winery Exposition and scholarship donors for your contributions.

Donate to the ASEV-ES Scholarship Fund at
https://www.asev-es.org/online-payments

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Student Presentation Competition Abstracts

Abstracts ordered alphabetically by last name of presenting author in bold

Haskap Variety and Winemaking Process Evaluations

Aditya Anand, Brent Trella, and Harlene Hatterman-Valenti*
*Corresponding author: North Dakota State University, Department of Plant Sciences, 1360 Abrecht Boulevard, Fargo, ND 58102, USA, h.hatterman.valenti@ndsu.edu

Haskap (*Lonicera caerulea*) plants are cold hardy, with relatively novel berries that are of increasing interest to North American fruit winemaking. Berries from eleven haskap varieties (cv. Aurora, Boreal Beauty, Boreal Blizzard, Honey Bee, Indigo Gem, Kaido, Kawai, Keiko, Solo, Taka, Tana) were stored frozen, measured for winemaking chemical parameters (titratable acidity, malic acid, pH, soluble solid content, YAN, color, and total phenolics), and then fermented into wine using different winemaking protocols. Berry micro lots (200 g) and macro lots (13 kg) were fermented to compare continuous submersion, punch down and accentuated cut edge (ACE) maceration regimes over 1, 2, and 5 d, with two different water amelioration levels (35%, and to 8 g/L titratable acidity) on the pressed juice must volumes. Total phenolic concentrations were measured, and sensory analyses conducted to select and rank the intensity of attributes from sensorial differences in aroma, mouthfeel and taste on the whole fruit, pressed berry solids marc, and the finished wines to determine phenolic extraction by maceration regime. Sensory panel results indicated that ACE and continuous cap submerged wines exhibited greater intensity in red fruit aroma, enhanced mouth-drying astringency, bitterness, and tannic structure. The use of ACE and continuous cap submerged wines from frozen haskaps resulted in higher pH, total phenolics, red color, tannin, bitterness, and astringency compared to other methods. These assessments will describe the selected commercially available haskap varieties and the effects of common winemaking process choices, characterizing their chemical and sensory impacts. They will also support approximating macro volume cellar technique results on laboratory microscale and stylistic winemaking decisions.

Aromatic Enhancement of Vidal Table Wine through Increased Volatile Thiol Production

Reid Ball, Debbie Inglis*, and Jennifer Kelly
*Corresponding author: Brock University, Cool Climate Oenology and Viticulture Institute (CCOVI), 1812 Sir Isaac Brock Way, St. Catharines, ON, Canada, dinglis@brocku.ca

In 2024, ~21,191 tonnes of Vidal were harvested, representing ~25% of Ontario's total grape tonnage. It is predominantly used in Icewine production, however post-COVID market and consumption trends indicate declining domestic and international Icewine sales. As Vidal possess sustainable growing properties which make it well-suited for the Ontario grape and wine industry, producers would benefit by diversifying its use beyond Icewine. Volatile thiols are a class of aromatic compounds associated with fruit-forward aromas desirable to consumers, such as the grapefruit and passionfruit notes in New Zealand Sauvignon Blancs. Past research identified several volatile thiols in Vidal wine; this research aims to determine if oenological treatments known to increase volatile thiols in other varietals can be applied to Vidal. These include increased fermentation temperatures, alternative yeast strains, and yeast micronutrients. To assess their impact on Vidal wine, seven treatment plans were trialed. First, a control using Saccharomyces cerevisiae EC1118 at 14°C, without micronutrient. Then, for each temperature of interest, 14°C, 20°C, and 26°C, a trial with and without the micronutrient, all fermented by Saccharomyces cerevisiae Sauvy. Preliminary data of the fermentation trials indicates the wines fermented to dryness (glucose and fructose<1g/L) and contain an average of 12% alcohol by volume. Significant differences in TA between wines imply the treatments may impart sensorial differences on more than the aromatic profile. TA was significantly lower ($p<0.05$) in treatments fermented at 14°C/57.2°F than treatments fermented at 20°C/68°F and 26°C/78.8°F. Next steps include volatile thiol and volatile organic compound analysis via gas chromatography-mass spectrometry.

Tetralone Abscisic Acid and a Multi-Omics Approach for Cold Hardiness in Grape Vine

Rachel A. M. Ciccone and Jim Willwerth*
*Corresponding author: Brock University, Cold Climate Oenology and Viticulture Institute, 1812 Sir Isaac Brock Way, L2S 3A1, St. Catharines, Ontario, Canada. jwillwerth@brocku.ca

Cold hardiness is a plant's ability to withstand sub-zero freezing temperatures during dormancy with minimal damage. This is important to the wine industry in the Niagara Region, as wine grapes are often at risk of damage from cold snaps and spring frost.

Five techniques can determine the cold hardiness of wine grape buds over time: RNA sequencing, hormone profiling, differential thermal analysis (DTA), carbohydrate analysis, and untargeted metabolomics (UTM). This is a multi-omics approach, which can study life from different perspectives. Abscisic acid (ABA), a plant phytohormone involved in dormancy and drought stress, can prevent spring frost and cold damage. A synthetic version of abscisic acid, called tetralone abscisic acid, can resist degradation in plants to induce a prolonged hardiness response. Tetralone ABA was applied to three wine grape cultivars—Marquette, Riesling, and Merlot—to study changes in their cold hardiness. A control, 0.5g/L, and 1.0 g/L dose were studied, alongside an additional pre-harvest 1.0g/L dose in Merlot. DTA was performed for the 2023-2024 dormancy period. It was found that, in both doses, Marquette, a cold hardy hybrid, was about 2ºC hardier than the control, but especially during deacclimation. Bud break was delayed by 1-2 weeks. Additionally, the pre-harvest 1.0g/L dose was also about 2°C hardier during deacclimation in Merlot, a cold sensitive cultivar. Finally, Riesling was about 1.5ºC hardier, but only during mid-winter and deacclimation as a cold tolerant varietal. Neither Riesling nor Merlot had bud break delay.

Student Presentation Competition Abstracts

Cold Hardiness Assessment in *Vitis riparia* and *Vitis amurensis* Mapping Populations Using Differential Thermal Analysis and Phenotypic Clustering

Hava Delavar and Harlene Hatterman-Valenti*
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Freezing injuries cause an estimated 15% global grape production loss annually, presenting a significant challenge to sustainable viticulture. This study investigated phenotypic variations correlated with cold hardiness in two bi-parental mapping populations to explore potential markers for cold hardiness selection. Additionally, quantitative trait loci (QTL) mapping was conducted to identify QTLs that could accelerate cultivar development of environmentally resilient grape varieties. Two mapping families of 312 F1 hybrids from *Vitis riparia* × *Vitis vinifera* "Fresno Seedless" and 302 F1 hybrids from *Vitis amurensis* × *Vitis vinifera* "Valley Pearl" were examined. Differential thermal analysis (DTA) was used to assess bud cold tolerance, complemented by comprehensive phenotypic trait measurements including bud water content, trunk and cane diameter, and post-budbreak phenology. Buds were analyzed after 7 and 28 days of cold storage at 4°C, examining low-temperature exotherms (LTE50). Significant variations were observed in cold hardiness and other phenotypic data. High-quality genetic linkage maps were successfully generated for both mapping populations, providing a crucial foundation for subsequent QTL analysis and marker identification. This research offers a potential sustainable strategy to develop cold-hardy grape cultivars that can maintain productivity under challenging environmental conditions and hasten the breeding processes in support of climate-adaptive viticulture.

Effects of Foliar Application of Prohexadione Calcium on Cluster Architecture and Post-harvest Bunch Rot of Cold-hardy Interspecific Grapevines

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Cold-hardy interspecific grapevines (CHIGs) are known to have longer rachis internodes than most *Vitis vinifera* cultivars, leading to loose clusters resulting in lower incidences of some types of bunch rot. At the same time, CHIG cultivar berries also have lower extractable tannins than *V. vinifera*, which can cause poor wine quality. A possible solution is the plant growth regulator prohexadione calcium (ProCa) a gibberellic acid inhibitor that, in *V. vinifera* cultivars, shortens internode length and increases tannin concentration, possibly due to reducing berry size. However, a potential trade off could be an increase in bunch rots due to cluster compaction. In 2022 and 2023, a low rate of ProCa was foliarly applied on *Vitis* 'Marquette' grapevines biweekly. At harvest, berry count, cluster weight, and pedicel lengths were assessed, and clusters were further rated bi-weekly for rot incidence for six weeks post-harvest. Results were variable: berry counts for ProCa treatments were significantly lower and clusters were slower to rot when compared to the untreated control in 2022, but there were no statistical differences in 2023. Though, in general, a low rate of ProCa did not have significant effects on rachis architecture parameters at harvest in either year. In 2024 and 2025, the same protocol was implemented with a higher rate of ProCa in an effort to increase tannin content. Preliminary results indicate that no statistical differences were observed in cluster architecture or on post-harvest rot under the higher rate in 2024 and yet to be determined for 2025.

Assessing Color and Phenolics of Wines Produced from Co-fermentation of Noble (*Vitis rotundifolia*) and Merlot (*Vitis vinifera*) Grapes

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While muscadine grapes (*Vitis rotundifolia* Michx) used for wine production can have issues with color and phenolic stability, co-fermentation with other varieties can enhance wine quality attributes. In 2023, Noble (*V. muscadinia*) and Merlot (*V. vinifera*) grapes were harvested, randomized into five co-fermentation treatments in duplicate (100% Noble, 75% Noble+25% Merlot, 50% Noble+50% Merlot, 25% Noble+75% Merlot, and 100% Merlot), processed, and fermented. At bottling, sulfur dioxide (SO_2) was added to each treatment at different molecular levels (0.0, 0.8, and 1.5 mg/L). Composition, color, and phenolic attributes of wines were evaluated at bottling and during storage (0-,6-, and 12-months) at 15°C. At bottling, wine pH (3.24-3.67), titratable acidity (0.60-0.80%), free SO_2 (18.53-42.43 mg/L), and ethanol (10.35-13.64%) varied. From 0- to 12-months storage, red color and color density decreased in wines with ≥ 25% Noble. However, at 12-months storage, both attributes were higher in blends with ≥ 25% Noble compared to 100% Merlot. SO_2 protected against red color loss in wine blends up to 6 months. Phenolic content of the wines increased from 0 to 6 months across all treatments but declined by 12 months. Monomeric anthocyanins decreased during storage, except in 100% Merlot wines. Wines with more Noble contained mostly 3,5-diglucosides anthocyanins, while wines with 100% Merlot contained only monoglucoside anthocyanins that were positively correlated to L*, showing blends with more Merlot were lighter. Co-fermenting with ≥25% Noble produced darker, redder wines with enhanced phenolic and monomeric anthocyanin levels, highlighting the beneficial impact of Noble grapes on wine blend quality.

Tannin Fragmentation Fingerprinting Applied: Uncovering the Impact of Oak and Commercial Additives on Wine Tannin Structure

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Tannin in wine consists of condensed tannins (CTs) from grape skins and seeds, and hydrolysable tannins (HTs), including ellagitannins (ETs) and gallotannins (GTs), introduced via oak or alternatives. They are key contributors to mouthfeel, aging potential, and wine structure. However, traditional methods often fail to distinguish subtle compositional changes caused by tannin additions or oak treatments. In this study, we applied a new rapid LC-MS/MS approach using in-source fragmentation—Tannin Fragmentation Fingerprinting (TFF)—to analyze the effects of tannin addition treatments on both CT and HT composition in wine. TFF enabled detailed subunit-level characterization of CTs, revealing structural differences in procyanidin composition that were not detectable using conventional spectrophotometric assays. In a CT tannin addition experiment with Noiret wine from Pennsylvania, TFF distinguished control samples from those with added commercial CTs by detecting increased levels of A-type procyanidins and revealing clear separation through principal component analysis, despite a traditional total phenolic measurement being unable to differentiate treatment. TFF was also applied to an experiment involving the addition of 15 commercial oak products to wine. The results showed that wines treated with French oak contained higher levels of both ETs and GTs compared to those treated with Hungarian or American oak, and that increased toasting levels reduced overall HT content. These results demonstrate the utility of LC-MS/MS fingerprinting for tracking tannin composition changes driven by winemaking inputs, offering a sensitive and scalable tool for monitoring oak treatments, additive usage, and product authentication.

Student Presentation Competition Abstracts

Transforming Historical Grape Veraison Data Set into an Online Tool for New York Grape and Wine Industry

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Grape samples have been collected and analyzed weekly during grape veraison from commercial and research vineyards across New York State since 2007. Sample data is shared in a weekly newsletter 'Veraison to Harvest'. This dataset represents an opportunity to leverage an existing resource into a powerful tool. Cleaning and transforming the data into an interactive webpage that is publicly accessible benefits stakeholders in the New York wine and grape industry. A scaled down version of the dataset was used to construct a test case for further stakeholder feedback. Data from 2008 to 2023 was cleaned using R before uploading to a Shiny application online. The dataset included 5964 entries comprising 50 plus grape cultivars, 7 growing regions, and 237 sampling sites. Brix data was paired with temperature data from the Network for Environment and Weather Applications and NYS Mesonet weather stations prioritizing distance and data completeness. The final result of this project is a publicly available webpage containing brix, temperature data and an interactive map (https://cornell-tree-fruit-physiology.shinyapps.io/Veraison_to_Harvest/). The challenges of data privacy and pairing weather data resulted in a more condensed site mapping (24 weather station sites) than the full 237 unique grape sampling sites represented in the data set. This project represents a foundational tool with potential to aid in stakeholder decision making and planning. The long-term vison is a modeling tool encompassing data across multiple disciplines such as pathology, entomology for future modeling and data repository to assist with decision making in real time based on emerging conditions.

Characterization of *Saccharomyces uvarum* CN1 and Its Potential for Rot-Affected Aromatic White Wines

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Sour rot and *Botrytis cinerea* infections pose significant challenges to grape growers and wineries by negatively impacting wine quality. Infected fruit is associated with elevated concentrations of compounds that negatively impact wines sensorially, primarily acetic acid. To ensure quality, wineries establish acetic acid thresholds (0.2–0.24 g/L), rejecting fruit that exceeds these limits, resulting in potential losses for growers and production delays in wineries. A locally isolated yeast *Saccharomyces uvarum* CN1 shows potential for acetic acid management. Previous studies demonstrated CN1's ability to metabolize acetic acid while enhancing volatile aroma compounds (VOCs) in red wines; however, its impact on aromatic white wines remains unexplored. This study investigated Riesling fermentations at varying rot levels (0%, 20%, and 40% by weight), inoculated with either CN1 or commercial strain *S. cerevisiae* EC1118. CN1-fermented wines exhibited significantly reduced acetic acid compared to juice values, with reductions of 13-fold in 0% rot, 6-fold in 20%, and 5-fold in 40%, resulting in final acetic acid levels of 0.05–0.02 g/L. Gas Chromatography-Mass Spectrometry (GC-MS) analysis revealed CN1-fermented wines showed significantly higher levels of VOCs associated with fruity, floral, and herbaceous compounds (ethyl isobutyrate, 2-phenylethanol, hexanol) while containing significantly lower levels of acetate esters and fatty acids (ethyl acetate, ethyl hexanoate, octanoic acid) linked to solvent-like, waxy, and fatty characteristics. These findings highlight CN1's potential to mitigate the negative impacts of sour rot and *Botrytis*, offering winemakers a viable approach to producing quality wines from fruit that would otherwise be discarded.

Student Presentation Competition Abstracts

Evaluating Seven Locally-isolated *Saccharomyces uvarum* Strains for their Capacity to Enhance the Aromatic Profile of Chardonnay Wine

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The Canadian wine industry is growing and becoming more competitive. Winemakers are constantly finding new ways to differentiate their wines in this expanding market. One potential strategy is to use non-traditional yeasts for fermentation. These non-traditional yeasts produce wines with different organoleptic profiles compared to wines fermented with traditional, commercial yeast. Such yeasts may produce less ethanol, less acetic acid which can be unpleasant at elevated concentrations in wine, or produce flavors that are different from traditional yeast. The natural yeast that exists on the skin of grapes can be isolated from spontaneous fermentations and then characterized to understand their winemaking potential. Previous work in our lab isolated and differentiated seven yeasts strains belonging to the *Saccharomyces uvarum* species. *S. uvarum* are known for producing lower ethanol and acetic acid but higher glycerol concentrations in wine. This project seeks to characterize these seven strains for chardonnay wine production compared to a commercial *Saccharomyces cerevisiae* control. All treatments using the *S. uvarum* isolates fermented to dryness and show an increase between 34% and 72% in glycerol production in the final wine compared to the control. Conversely, the acetic acid production decreased between 58% and 86% in the wine produced with the 7 *S. uvarum* strains. These results show that *S. uvarum* strains have the potential to be a new tool in the winemaker's toolbox.

Evaluation of New Perfect-flowered Muscadine Grape Cultivars for Sustainable Production in Alabama

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Muscadine grape (*Vitis rotundifolia* Michx.) is native to the Southeastern U.S., and is valued for plant's resilience, high nutritional content, and lower input costs in comparison with the bunch grapes. In Alabama, grape cultivation increased by 38% between 2007 and 2022, which indicates a significant growth. Recent releases of perfect-flowered cultivars offer the potential for further expansion, but empirical data on new cultivars' performance in Alabama climate is very limited. An experimental plot was established at the Chilton Research and Extension Center, Clanton, AL, in 2019 aiming to assess the vegetative growth, production potential, and fruit quality attributes of 'Hall', 'Lane', 'Paulk', 'RazzMatazz' and 'Southern Home' alongside pistillate cultivars 'Eudora' and 'Supreme' (standard). The experiment was set up as a CRBD with four single vine replications. During 2024 season, harvesting of 'Hall', 'Lane', and 'RazzMatazz' started early in the season (mid-August), and was followed by 'Paulk' and 'Supreme' which matured in late-August. 'Eudora' and 'Southern Home' were harvested in September. 'Eudora' produced the highest total yield (48.6 kg/vine) and also had high percent berries with wet stem scar (20.2%). 'Paulk' produced the largest berries (12.3 g) exceeding the size of the standard 'Supreme' (11.8 g). While the berries of 'Supreme' had the highest flesh firmness, the fruit of perfect-flowered 'Eudora', 'Hall,' and 'Southern Home' was sweeter than 'Supreme'. Additionally, 'Hall' produced less berries with wet stem scar than 'Supreme'. These findings can assist growers with proper cultivar selection for sustainable muscadine production in Alabama.

The Influence of Three Packaging Materials on the Properties of Carbonated Blueberry Wine under Accelerated Storage Conditions

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Wine is a dynamic matrix containing flavor compounds derived from volatile organic compounds (VOCs) and basic tastes attributed to sugars (sweetness), organic acid (sourness), and polyphenols (bitterness/astringency). These components may interact with the packaging material, significantly affecting the consumer experience. Alternative packaging has gained popularity due to portability, convenience, and recyclability. This project was built on previous research and investigated the chemical changes in carbonated blueberry wine packaged in aluminum cans, polyethylene terephthalate (PET), and glass bottles at accelerated temperatures (35°C) for 60 days to parse the capacities of alternative packaging. Several analyses showed no significant difference ($p < 0.05$), including TA, pH, sugar, and alcohol. The primary VOC classes identified included alcohols, acids, aldehydes, esters, and terpenes, with a starting concentration of 64.5 mg/L. The VOC analysis showed changes over time, with cans (70.8 mg/L) outperforming PET (44.4 mg/L) and glass (58.9 mg/L) bottles demonstrating suboptimal flavor stability. Moreover, there was a significant difference in spectrophotometric color intensity over 60 days, with a starting value of 1.78 AU for all packages; the mean of the aluminum cans, PET bottles, and glass bottles was 1.67, 2.09, and 1.84 AU, respectively. Additionally, free (starting 46.9 mg/L) and total (starting 140 mg/L) sulfites significantly differed after 60 days, as cans outperformed glass and PET bottles in both analyses. These research findings suggest that PET and glass bottles are not the ideal packaging types for carbonated blueberry wine. However, cans exhibit minimal chemical changes over time, supporting cans as a viable alternative package.

ASEV-ES Conference Planning in Georgia

Nathan Eason, Sarah Lowder, and Phil Brannen, University of Georgia

Technical Session Abstracts

Resilient Vines for a Challenging Climate: Evaluating Disease-Resistant White Wine Grapes in the Mid-Atlantic
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Grape producers in the Mid-Atlantic region face persistent challenges from grapevine pathogens due to humid growing conditions conducive to bacterial and fungal diseases. While various management strategies exist, including chemical applications and canopy management practices, these can be costly, labor-intensive, and insufficient during unusually wet seasons. The development of disease-resistant wine grape varieties offers a promising solution to these challenges. This study evaluates four white wine grape varieties—Soreli, Fleurtai, Itasca, and Petra—developed by various breeding programs to determine their suitability to the Mid-Atlantic region. Planted in 2019 in Winchester, VA, these varieties are being assessed for growth characteristics, yield metrics, fruit composition, disease resistance, and bud cold hardiness. The primary objective is to identify optimal varieties for high-quality grape and wine production under the region's challenging climatic conditions. Budding in Fleurtai and Petra occurred two days earlier than in Chardonnay, whereas Itasca and Soreli budded six days later. All four varieties ripen early, with Petra ripening the latest. Vigorous growth was observed in Fleurtai, Petra, and Itasca, while Soreli exhibited very vigorous growth. Among the varieties, Soreli produced the largest clusters (151 g) and the highest yield (7.2 t/A), whereas Itasca had the smallest clusters (78 g) and lowest yield (2.9 t/A). Bud necrosis was observed in Petra and Fleurtai, while bunch stem necrosis occurred exclusively in Fleurtai. Soreli showed a high incidence of sour rot. Notably, all four varieties demonstrated resistance to Downy and Powdery mildew, even after the spray program was discontinued annually at veraison.

Spotted Lanternfly-driven Changes in Grapevine Physiology and Production: Insights from Multiple Studies
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The spotted lanternfly (SLF; *Lycorma delicatula*), a phloem-feeding invasive insect, has caused significant economic damage to vineyards in the Eastern U.S. since its 2014 detection. Infestations lead to reduced grapevine yield, vine decline, and increased pesticide use in heavy infested vineyards, threatening grape production sustainability. Since 2019, our research team has investigated the effects of nymph and adult SLFs on grapevine physiology, fruit production, juice and wine composition across several *Vitis vinifera* cultivars (e.g. Chardonnay, Cabernet franc, Riesling) as well as its potential role in transmitting important grapevine pathogens. Collectively the scope of this work was to understand the potential economic damage of this invasive pest and help identify action thresholds and develop a more targeted integrated SLF management program. Our findings showed that prolonged SLF sap-feeding (over three weeks) negatively impacted grapevines, reducing carbohydrate accumulation in plant tissues (e.g., roots) and disrupting physiological processes essential for long-term plant health. Heavy feeding by adult SLF also lowered juice total soluble solids and phenolic concentration at harvest in Cabernet franc. In addition, SLF infestations over multiple consecutive years significantly decreased grapevine yield parameters, such as fewer clusters per vine and lower cluster weight. This presentation will also review recent research on SLF as a potential vector for important grapevine pathogens, such as *Xylella fastidiosa subsp. fastidiosa*, and whether SLF's impact on grapevines varies when vines are infected with X. fastidiosa.

Pierce's Disease Resistant Grape Varieties: New Implications and Possibilities for the Southeastern U.S.
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Pierce's Disease (PD), caused by the bacterium, *Xylella fastidiosa* (Xf) is the single most geographically limiting factor for growing *Vitis vinifera* and European hybrid grapes in the Southeastern U.S. Xf clogs the plant's xylem, restricting water flow above the infected tissue and spreading throughout the vine, typically proving fatal to infected vines within three years. The precise boundaries of previously mapped PD risk zones are unclear and have shifted over time. The 2019 release of crosses of *V. vinifera* and *Vitis* arizonica, PD resistant grape varieties, by the University of California, Davis provides major implications for viticulture in the region. The recent testing in the Southeastern U. S. of these new varieties is an important development in regional PD mapping. This project's novel methodology precisely reveals the dividing line between *V. vinifera* and PD resistant grape variety suitability zones across the Southeast. ArcGIS Pro software is used to iterate through 14,610 daily PRISM climate surfaces (1981-2020), maps of PD risk, precipitation, frost free period, and four temperature-based heat accumulation indices were generated. An eleven-state area of ~411,600 km2 was determined to be at risk of PD, but otherwise potentially suitable for European winegrape production.
Conclusions and significance: The release of PD resistant cultivars has potentially opened a large zone of the Southeastern U.S. to European style wine production. This research mapped the boundaries of the PD risk zone where these new varieties might best be trialed for regional suitability. Additionally, current PD risk zones are updated and identified.

Evaluation of Tissue Nutrient Concentrations in Cabernet Franc Vineyards in Pennsylvania
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Sufficient grapevine nutrient status optimizes long-term vineyard health and productivity. One method of assessing grapevine nutrient status is through measuring nutrient concentrations which, in the US, has primarily been conducted through the analysis of leaf petioles. However, recent research has shown that grapevine leaf blade nutrient concentrations better relate to responses such as crop yield and pruning mass. Grapevine tissue nutrient sampling methods and sufficiency ranges may benefit from further refinement, such as by region, tissue type, and/or growth stage. Field trials were set up in five commercial Cabernet Franc vineyards across Pennsylvania to quantify nutrient concentrations in leaf petioles and blades at bloom and veraison, and to evaluate tissue nutrient relationships with commercially important grapevine responses. In the first project year (2024), and relative to published standards for leaf petioles and blades, concentrations of some tissue nutrients at bloom or veraison have ranged from deficient to sufficient, sufficient to excessive, or deficient to excessive across the five vineyard sites. Additionally, concentrations of some tissue nutrients at bloom or veraison have ranged from deficient to sufficient or from sufficient to excessive at multiple Cabernet Franc vineyard sites. When related to grapevine responses of commercial interest, these nutrient concentration ranges may provide an opportunity to refine nutrient sufficiency ranges.

Technical Session Abstracts

Identification of a Novel Powdery Mildew Susceptibility Locus in 'Chambourcin'

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Powdery mildew, caused by the fungus *Erysiphe necator*, is a major cause of grape yield loss worldwide. Although many resistance loci have been identified in various grapevine species, the genetic factors underlying susceptibility to *E. necator* remain largely unexplored. Understanding the genetics of susceptibility to disease is equally important for developing grapevines with lasting resistance to this pathogen. To identify these factors in *Vitis* interspecific hybrid 'Chambourcin', a two-year controlled leaf disc assay was conducted using the Automated Phenotypic System (APS). This assay involved 273 F1 genotypes derived from a cross between 'Chambourcin' and *Vitis vinifera* 'Cabernet Sauvignon'. A high-density linkage map was also constructed using the same mapping population, which included 355 simple sequence repeats (SSR) and 1,394 RNaseH2-dependent amplicon sequencing (rhAmpSeq)-derived haplotype markers. A total of 1,794 markers were grouped into 19 linkage groups (LGs), spanning a total genetic distance of 1,695 centimorgans (cM). A quantitative trait locus (QTL) analysis revealed a susceptibility locus to *Erysiphe n*ecator (Sen2) on LG7. The markers associated with this trait were further applied to screen 1,512 diverse accessions in the USDA-ARS cold-hardy *Vitis* collection, leading to the identification of 78 genotypes carrying *Sen2* and 6 accessions that encode recessive resistance. These markers can be directly utilized not only to selectively exclude susceptible progenies via marker-assisted selection but also for future gene identification, enabling targeted approaches such as gene knock-out, gene editing or RNA interference (RNAi).

Elucidating the Grape and Wine Microbiome in Spontaneous Riesling Fermentations

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Wine character is highly influenced by many factors, including the microbial flora on the grape surface. This microbial terroir contributes to a region's ability to craft wines with unique characteristics, particularly due to non-*Saccharomyces yeasts* (NSY). We isolated NSY in 2023 and 2024 from the surface of Riesling grape berries and throughout native fermentations sourced from a New York state winery using standard culture techniques and ITS amplification followed by sequencing. Thus far, we have isolated five NSY on berries, eight in juice prior to fermentation and three during active fermentation. Many of these NSY identified could be responsible for the aromatic profile of the finished wines including *Hanseniaspora uvarum* and *Metschnikowia pulcherrima*. Shallow shotgun sequencing was also performed on 2023 and 2024 samples to elucidate the entire microbiome, including culturable and non-culturable fungi and bacteria. Additional NSY and bacteria were identified throughout the winemaking process. Bacteria of interest include *Gluconobacter* and *Tatumella* species. Ongoing research will focus on the characterization of the major NSY species isolated from spontaneous fermentation and their contributions to wine aroma complexity. These results may lead to the generation of a unique starter culture for more consistent and reliable native ferments to achieve sustainability. This research will also assist in defining the unique "microbial terroir" of winegrowing regions.

Evaluating Bird Laser Performance and Acoustic Monitoring for Vineyard Biodiversity Assessment

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Over three years (2022–2024), we evaluated bird laser deterrents at the Northwest Michigan Horticultural Research Center (NWMHRC) experimental vineyard to assess their effectiveness in reducing bird damage across multiple grape cultivars. Results indicate that laser technology significantly mitigated damage compared to control areas, with varying effectiveness among cultivars.

In 2024, in collaboration with Purdue University's Ecological Sciences and Engineering Program, Forestry and Natural Resources Department, and Center for Global Soundscapes, we expanded the project by deploying acoustic sensors to analyze bird population dynamics and biodiversity. This initiative compared avian activity in laser-protected and control vineyard areas and assessed vineyard management's broader ecological impact. Preliminary findings suggest laser deterrence reduces bird damage but may alter avian community composition. Acoustic monitoring revealed lower Acoustic Complexity Index (ACI) values in laser-protected areas, indicating fewer vocalizing species and reduced acoustic activity. Control areas exhibited higher Acoustic Diversity Index (ADI), Acoustic Entropy Index (H), and Bioacoustic Index (BI) values, reflecting greater species diversity, richer habitats, and more frequent bird vocalizations. The Acoustic Evenness Index (AEI) was also higher in control areas, suggesting a more complex soundscape. This study highlights the importance of integrating technological and ecological monitoring to optimize bird management while maintaining vineyard biodiversity.

Exploring Consumer Perceptions of Alternative Wine Packaging: Environmental and Recyclability Impacts

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Sustainability efforts in the grape and wine industry have become a prominent focus where wine packaging, primarily the use of glass bottles, can account for up to a third of the carbon footprint associated with wine production. While alternative packaging materials are emerging, consumers often perceive glass as the optimal packaging material for wine. An online discrete choice experiment was conducted with 2,000 U.S. wine consumers to explore consumer perceptions and price premiums/discounts associated with aluminum, polyethylene terephthalate (PET), and flexible wine packaging (750 mL) compared to glass bottles. Information on carbon footprints and recyclability ease was provided in varying contexts to evaluate its influence on consumer preferences. Consumers chose glass packaging the most (62.55%), followed by aluminum (19.23%), PET (9.43%), flexible bags (4.45%) and none of these options (4.34%). Willingness-to-pay for wine in glass ranged from $30.93-$33.78, $22.84-$26.56 for aluminum packaging, $19.51-$22.91 for PET packaging, and $15.44-$20.36 for flexible bags. Results showed that relative discounts ranged from 19.30% to 26.16% for aluminum, 31.09% to 36.92% for PET, and 38.13% to 54.29% for flexible bags compared to glass bottles. Alternative packaging achieved the lowest market share without information (27.22%) and the highest when carbon footprint data was provided (34.40%). While glass remained the preferred packaging, aluminum was favored over PET and flexible bags. These findings suggest that educating consumers about the environmental and reliability benefits of alternative packaging can increase adoption alternative packaging for wine, supporting the industry's transition toward more sustainable practices.

Technical Session Abstracts

Enhancing Phenolic Content in Marquette Wine through the Addition of Stems from Marquette and Itasca Grape Cultivars

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Grape stems, rich in fibers and phenolic compounds, are underutilized in the grape and wine industry. Whole cluster fermentation has shown potential for increasing tannin concentration in wines made from interspecific grape cultivars specifically due to the use of stems. This study aimed to evaluate the impact of adding stems from two grape cultivars on the chemical composition of Marquette wine. In 2024, Marquette and Itasca grapes were harvested and destemmed, and Marquette wines were made with stems from both cultivars added to Marquette musts before fermentation. Five treatments were evaluated: Control (CTL), Marquette fresh stems (FS), Marquette dry-ground stems (DGS), Itasca fresh stems (ICFS), and Itasca dry-ground stems (IDGS). Chemical parameters, including pH, titratable acidity, hue, color intensity, and phenolic concentrations, were analyzed at three timepoints: crushing, pressing, and bottling. No significant differences ($p \leq 0.05$) were found between treatments for pH, titratable acidity, color intensity, and CIELab parameters L* and a*. Hue was lower in FS wine than IDGS at pressing, but no difference was found at bottling. Phenolic concentrations were higher in FS and ICFS wines than in CTL, DGS, and IDGS wines. Despite a higher concentration of proteins and phenolics in Itasca stems than in Marquette stems, the type of stems did not significantly affect the chemical composition of Marquette wine. However, drying and grinding stems (DGS and IDGS) did not enhance phenolic concentration, suggesting that the fresh stems' properties facilitate phenolic extraction. These results will be discussed in comparison with data from 2023.

The Effect of Gibberellic Acid Sprays on Fruit Quality of Cold Hardy Table Grapes

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The University of Minnesota Horticultural Research Center has been breeding grapes for more than 125 years. The Grape Breeding Program has focused on breeding high quality cold hardy wine grapes, and recently the focus has shifted to include breeding exceptional cold hardy table grapes for Minnesota and Upper Midwest growers. Three advanced selections were chosen for seedlessness, unique flavors, and textures; however the berries and clusters are still small in comparison to commercial grapes. Gibberellic acid (GA) is widely used in established table grape-growing regions and has shown to have positive effects on fruit quality, but little is known about its utility in cold hardy grapes. This study aims to investigate the use of GA spray treatments on three advanced breeding selections and three available cold hardy grape cultivars. GA applications occurred at two time points during the season (bloom and fruit set) and included three different GA concentrations: 0 ppm, 25 ppm and 50 ppm. Statistical analyses of our first year's data collection showed an increase in berry diameter, weight, and cluster weight. The 50 ppm concentration showed the greatest impact with berry and cluster size and weight. The GA applications will be repeated this upcoming season. More data and knowledge needs to be collected and analyzed in order for local growers to adopt GA application in their own vineyards, and to produce higher quality fruit products. Improved fruit quality of locally grown grapes will appeal to local consumers, and help initiate a new table grape industry in Minnesota and Upper Midwest.

Student Poster Competition Abstracts

Vineyard Nitrogen Management: Impacts on Chardonnay Grape Chemistry Characteristics in Virginia
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Plant nutrition is key in vineyard management, directly affecting fruit quality. Nitrogen from fertilizers influences berry composition and yeast-assimilable nitrogen (YAN), essential for yeast growth during fermentation. The amino acid profile also contributes to YAN, impacting fermentation and wine quality. However, the impacts of nitrogen application on pools of fruit nitrogen remain poorly understood. This study aims to evaluate the effects of soil and foliar nitrogen fertilization on Chardonnay grape composition grown in Virginia by assessing YAN and amino acids concentrations in juice. Two field experiments were conducted in Chardonnay vineyards in Virginia (Winchester and Fort Defiance) over two years (2023 and 2024) to evaluate the impact of soil and foliar nitrogen fertilization on juice chemistry. Three different rates of soil nitrogen (SN) and two rates of foliar nitrogen (FN) were implemented at each site. YAN, composed of primary amino nitrogen (PAN) and ammonia (AMM), was analyzed at two vine phenological stages: two weeks post-veraison and at harvest. Additionally, concentrations of 19 amino acids were assessed exclusively at harvest. Juice PAN was influenced by year, vine stage, and soil and foliar nitrogen, while AMM was affected by all except year. Among interactions, only year-FN impacted PAN, with no effect on AMM. Proline, glutamine, and arginine were the most abundant amino acids at both sites. SN had the strongest influence across the amino acid profile, followed by FN, which had a greater impact in Fort Defiance than Winchester. Year affected prevalent amino acids concentrations as they varied between both years.

Impact of Different Strains of *Lachancea thermotolerans* Yeast on Acids and Sugars during Chambourcin Wine Fermentations
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There is increased interest in using non-*Saccharomyces* yeasts, such as *Lachancea thermotolerans*, to enhance wine complexity and resolve acidity issues. In 2023, Arkansas-grown Chambourcin (*Vitis* hybrid) grapes were hand-harvested, randomized into batches, crushed, and destemmed. Seven inoculation treatments, in duplicate, were conducted using Saccharomyces cerevisiae (SC) and three strains of *L. thermotolerans* including a commercial strain (LAK) and two experimental strains (LT1 and LT2) that received sequential S. cerevisiae inoculations after 24 or 48 hours. All treatments were co-inoculated with malolactic bacteria. Sugar and acid attributes of the must/wines were evaluated during fermentation at 21°C (0, 3, 6, 9, and 12 days) and at bottling. At harvest, grapes had 20.36% total sugars, 3.77 pH, 0.61% titratable acidity, 0.37% malic acid, and 1.19% total organic acids. All treatments completed alcoholic fermentation by day 6 where SC wines had the highest pH (3.89) with other treatments ranging from 3.58 to 3.74. By day 12, LT2-SC-48 hr wines had the highest titratable acidity (0.84%) and lactic acid (0.35%). At bottling, SC wines had the highest pH (4.00), while other treatments ranged 3.82 to 3.87. LT1-SC-48 and LT2-SC-48 wines had the highest lactic acid (0.43–0.46%) and total organic acids (0.91–0.92%) compared to SC wines (0.25% and 0.72%, respectively). *L. thermotolerans* strains, in mixed inoculation with *S. cerevisiae*, produced Chambourcin wines with lower pH and higher titratable acidity and lactic acid. This fermentation approach offers a natural way to enhance acidity, stabilize microbial balance, and address winemaking challenges in warm-climate regions.

Assessment of Vine Spacing and Vertical Division on Yield and Quality of Medium and High-Vigor Muscadines
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Muscadines (*Vitis rotundifolia*) are relatively pest- and disease-resistant native American grape species with great potential for fresh consumption and wine production. Planting density is a major decision in vineyard establishment, influencing grape yield and quality. However, limited research has explored planting densities for commercial production in muscadines. This study evaluated the effects of three vine spacing (3 m, 4.6 m and 6 m) and two vertical division treatments (undivided vs divided) on the yield and quality of five-year-old muscadine cultivars- 'Paulk' (medium-vigor, fresh market) and 'Carlos' (high-vigor, processing) in 2023-24. In 'Paulk', on average, vines spaced at 3 m yielded 2360 kg/ha and 3811 kg/ha more than those at 4.6 m and 6 m, respectively ($p<0.001$), and undivided vines yielded 1113 kg/ha more than divided ones ($p=0.04$). 'Carlos' showed no significant yield response to either treatment. Additionally, in 2023, total soluble solids (TSS), titratable acidity (TA) and pH in 'Paulk' remained unaffected by both treatments, while in 'Carlos', 6 m spacing had 1°Brix higher TSS ($p=0.04$) and 1.1 g/l lower TA ($p=0.006$) than those at 3 m spacing, but vertical division had no effect on fruit quality. These findings demonstrate that closer spacing may improve yield in medium-vigor muscadines without compromising fruit quality, while vertical division may not. In contrast, closer spacing and vertical division may not benefit high-vigor muscadines, making industry standard 6 m spacing more suitable.

Differential Responses of Petite Pearl and Marquette Grapevines to Cold Stress in Protected and Open Field Systems
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Climatic conditions influence grapevine phenology, fruit quality, and yield. Among environmental factors, cold stress is particularly damaging to grapevines, disrupting metabolism, and reducing fruit set, yield, and survival, and therefore causes major limitations in the commercial grape cultivation in the Upper Midwest. To potentially mitigate cold stress, a field experiment in 2024 was conducted to evaluate 'Petite Pearl' and 'Marquette' performance under open-field and caterpillar tunnel conditions. Grapevines exhibited diverse responses to growing conditions, with cultivar, environments, and their interaction influencing various traits. Bud survival was higher in the tunnel (79.02%) than the open field (67.66%) but did not differ between cultivars. Cultivar x location interactions significantly affected bud burst, flower initiation, cluster length, and yield per vine, showing trait-specific responses to growing conditions. The tunnel, compared to open field, advanced bud burst in 'Marquette' (130 vs 132 days) but delayed bud burst in 'Petite Pearl' (146 vs 140 days), respectively. In contrast, Marquette' recorded its longest cluster (16 cm) in open field while 'Petite Pearl' produced longest clusters in tunnel (13 cm). 'Petite Pearl' had higher yields per plant in the tunnel compared to open field (6.37 kg vs 3.95 kg), while 'Marquette' yield was just the opposite (3.50 kg vs 2.75 kg), respectively. 'Marquette' had higher TSS (27.83 °Brix) and TA (2.08%) than 'Petite Pearl' (25.29 °Brix, 0.85% TA), while 'Petite Pearl' had higher fruit pH (3.25) than 'Marquette' (3.06). Thus, a caterpillar tunnel can improve bud survival in cold climates while phenological and fruit responses were cultivar-dependent.

Student Poster Competition Abstracts

Heritability of Fruit Quality Traits in a Population of Cold-Hardy Grapes

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North Dakota's short growing season makes growing grapes challenging. The solution is to choose grape cultivars that are adapted to our climate. However, there is still a limited selection of hardy cultivars available. A half-diallel population bred from five cold-hardy parents was used to calculate heritability of fruit quality traits. Fruit samples were collected at 2-week intervals through the ripening period. Titratable acidity, Brix, pH, yeast-accessible nitrogen, ammonia, malic acid, alpha amino data were collected using an Oenofoss machine. The most heritable traits included pH (broad sense heritability 0.5), titratable acidity (broad sense heritability 0.47), and malic acid (broad sense heritability 0.4). The least heritable traits included ammonia (broad sense heritability 0.34) and berry weight (broad sense heritability 0.38). General combining ability was far more likely to be significant than specific combining ability. This means that the contributions from each individual parent matter more than the unique effects of crossing specific parents. These results will help cold-climate grape breeders make better crosses, which will lead to more cultivar options for our grape growers.

Validation of A New Method for Tannin Fingerprinting and Quantification via LC-MS/MS and Electrospray Ionization In-Source Fragmentation

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Tannins are crucial to mouthfeel, and aging potential in wine. They are categorized into condensed tannins (CTs) from grape and hydrolysable tannins (HTs) from oak and alternatives, including ellagitannins (ETs) and gallotannins (GTs. However, current analytical methods lack specificity, sensitivity, or require extensive sample preparation, limiting their ability to capture tannin complexity. To overcome these challenges, we developed Tannin Fragmentation Fingerprinting (TFF), a rapid LC-MS/MS method using in-source fragmentation for comprehensive tannin characterization. TFF applied three cone voltages (30, 110, and 140 V) in the ion source to depolymerize the CTs to generate the in-source ion spectra, which are further fragmented in the collision cell, using multiple reaction monitoring (MRM). MRM transitions from analytical CT standards are correlated to target samples via multidimensional linear regression, enabling comprehensive fingerprinting while retaining chromatographic information related to compound polarity. TFF demonstrated high accuracy in predicting mean degree of polymerization (mDP) across 19 mixtures of B-type CTs (DPs 1–5). For HTs, TFF enables high-throughput quantification, breaking down ETs and GTs into ellagic acid and gallic acid. By integrating their peak areas and converting concentrations to monomer equivalents, TFF provides an accurate measurement of total ETs and GTs, significantly reducing sample preparation. Validation across 30 white and 33 red wines showed a strong correlation ($r^2 = 0.98$) with the acid hydrolysis method while cutting preparation time from hours to minutes. TFF offers a powerful new tool in tannin research and wine quality assessment, especially when looking to characterize tannin differences missed using other methodology.

Chemical Composition of Grape Pomace from Interspecific Marquette and La Crescent Grape Cultivars

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Grape pomace accounts for more than 20-25% dry mass weight and is typically used for compost or discarded in landfills. However, it holds potential as a source of bioactive compounds. While the chemical composition of pomace from *Vitis vinifera* cultivars is well-documented, less is known about pomace from Midwestern interspecific grape cultivars. The goal of this study was to analyze the chemical composition of grape pomaces, obtained from Marquette and La Crescent grapes through standard winemaking and dried by air (IS) or vacuum (RV) methods. Pomace chemical composition, including water activity, protein concentration, ash and phenolics concentration and composition were evaluated. All water activity values were below 0.6, preventing microbial growth, with IS pomace showing lower water activity than RV. Crude protein concentration was higher in white (La Crescent) than red (Marquette) pomace. Total phenolic content, measured by both the iron-reactive phenolics (IRP) and Folin Ciocalteu (FC) assays, was also higher in La Crescent pomace, due to white grape pomace being discarded after pressing, as opposed to red grape pomace, which extracts phenolic compounds from grapes during fermentations up to pressing. The IRP assay reported significantly lower phenolic concentrations than the FC assay, which potentially overestimated phenolic levels by analyzing all antioxidant compounds. Ongoing research explores the fiber, sugar, and organic acid content, antioxidant capacity, microbiological properties of grape pomace, and its potential as a natural alternative to synthetic additives in pork sausages.

Poster Session Abstracts

Under-vine Creeping Red Fescue Modifies Vineyard Soil Water Dynamics
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Perennial under-vine cover crops, like creeping red fescue (CRF), can mitigate vegetative growth in vigorous vineyards, prevent erosion, and improve soil health, but they can also decrease yield if they are overly competitive for soil resources. There is still limited information on how CRF or other under-vine cover crops alter vine water availability in rainfed vineyards. CRF might increase vineyard water demand but at the same time increase soil water availability through higher infiltration rates, because of the grass high rooting density and fine roots. In this study, we addressed how CRF impacts soil saturated hydraulic conductivity (Kfs) and long-term shallow soil moisture (10cm, 20cm, 30cm) in the under-vine area in a Noiret (*Vitis* hybrid) vineyard 9 years after its establishment. We found that average Kfs for the CRF treatment was an order of magnitude greater (0.0112 cm/s) than the herbicide strip treatment (.00322 cm/s; $p < .05$). While not statistically comparable, the mean Kfs of the under-vine region was similar to the inter-row soil planted with hard red fescue. Multi-year shallow soil moisture values show similar seasonal cycles in both CRF treatments and herbicide strip treatments. Despite the increased infiltration rates the shallow soil tended to be drier in the under-vine CRF treatment during periods without rainfall. These results indicate that despite increased infiltration, under-vine CRF compete for shallow soil water with grapevines during dry periods. However, increased infiltration may still increase water percolation, potentially offsetting shallow water competition due to the grapevine root redistribution lower in the soil profile.

Foliar-applied Potassium Sulfate Enhances Cold Hardiness of Hybrid Grapevines
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Cold hardiness is essential for grapevine survival in northern viticultural regions. Previous research has shown that foliar-applied potassium sulfate (K_2SO_4) enhances cold hardiness in *Vitis vinifera*; however, its effects on cold-hardy interspecific hybrids remains unknown. This study evaluated the impact of foliar-applied K_2SO_4 on the cold hardiness of the interspecific grapevine hybrids 'Petite Pearl' and 'Marquette' using a two-factor full factorial experiment arranged in a randomized complete block design. The K_2SO_4 was applied four times between fruit set and harvest at concentrations of 0%, 2%, 3%, and 4%. Cold hardiness was assessed by measuring low-temperature exotherms (LTE) from six buds per experimental unit. No significant interaction was observed between cultivar and K_2SO_4, nor did cultivar independently affect cold hardiness. Each 1% increase in K_2SO_4 application significantly reduced high LTE by 0.56°C, suggesting an influence on early cold acclimation. However, further replication is needed to clarify the relationship between mean LTE and K_2SO_4 and to assess whether higher rates or alternative timings enhance cold acclimation. Taken together, these results suggest that foliar-applied K_2SO_4 may improve cold acclimation and winter survival in cold-climate grapevines, although additional studies are required to assess the impact on vine health and enological parameters..

Grapes Winemaking by different Yeast Strains
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Marquette and Petite Pearl are cold-hardy hybrid grape cultivars gaining interest in North American winemaking. Grapes from a blended lot (cv. Marquette and Petite Pearl) were fermented using three different Saccharomyces cerevisiae yeast strains to evaluate their impact on winemaking chemical parameters. Small-scale fermentations were conducted on 200 g berry micro-lots with a 5-day maceration period to assess differences in pH, total acidity, malic acid, yeast assimilable nitrogen (YAN), color intensity, and total phenolic content. Total phenolic concentrations were measured, and chemical analyses were conducted to determine the influence of yeast strain on acid balance, nitrogen utilization, and phenolic extraction. Results indicate that variations in yeast metabolism affected malic acid degradation, contributing to differences in final wine acidity and pH stabilization. Color intensity and phenolic retention were dependent on yeast-specific interactions with grape polyphenols during maceration. YAN utilization varied across strains, influencing fermentation and aroma. The use of different yeast strains resulted in distinct chemical attributes, with some strains enhancing red color intensity, total phenolics, and acidity, while others favored a softer mouthfeel and greater pH stability. These findings characterize the effects of yeast selection on hybrid grape wine fermentation, linking microbial influence on chemical attributes.

Poster Session Abstracts

From Dawn to Dusk: Nutrient Dynamics in Chardonnay and Chardonel Vines

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Tissue sampling is a crucial tool in viticulture for assessing vine nutrient status and optimizing fertilization strategies. Despite recommendations to sample grape leaves at bloom and veraison, uncertainties persist regarding the optimal sampling time of day and leaf part (petiole or blade) due to nutrient fluctuations. This study aimed to investigate diurnal variations of micro- and macronutrients in leaves of *Vitis vinifera* (Chardonnay) and interspecific *Vitis* hybrid (Chardonel) grape varieties, as well as daily nitrogen dynamics in berries. A three-year experiment (2022–2024) was conducted on Chardonnay and Chardonel vines grown in two Shenandoah Valley, VA, vineyards to evaluate the influence of sampling time on nutrient concentration in leaf and petiole tissues and yeast-assimilable nitrogen (YAN) dynamics in berries. At veraison, five blocks of 4 to 6-vine panels were sampled at 0800, 1200, and 1600 hours. Leaf blades and petioles were analyzed separately for macronutrients (N, P, K, Mg, Ca) and micronutrients (B, Mn, Fe), while concurrently collected berries were assessed for YAN, which is composed of primary amino nitrogen (PAN) and ammonium ions. Sampling time significantly influenced K levels in Chardonnay petioles, while other elements remained stable. A year × time interaction affected B concentrations in Chardonnay petioles. Minimal diurnal fluctuations occurred for macro- and micronutrients in Chardonnay leaf blades across sampling times. Conversely, in Chardonel, year × time interactions modulated K and Mg levels in leaf blades. YAN, PAN, and ammonia concentrations remained unaffected by sampling time in Chardonnay and Chardonel.

Evaluating Methods to Measure Free and Total Sulfur Dioxide in Wine

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Sulfur dioxide (SO_2) is used during wine production, typically at 0.5-0.8 mg/L molecular SO_2 to maintain quality. Methods for SO_2 analysis measure/calculate free, bound, or total SO_2 using the Aeration/Oxidation (A/O) or colorimetric (typically as kits) methods. The accuracy, costs, and time for the A/O method and two colorimetric kits was done to measure free and total SO_2 in standard and wine (*Vitis*) samples using three methods 1): A/O; 2) Megazyme (Neogen® Bray, Ireland); and 3) BioSystems (Barcelona, Spain). For the standards, free SO_2 (12.5, 25, 50, 75, and 100 mg/L) and total SO_2 (50, 100, 200, 300, and 400 mg/L) were evaluated. For the wines five co-fermentation treatments of Merlot (*V. vinifera*) and Noble (*V. rotundifolia*) wine were bottled at three molecular SO_2 levels (0, 0.8, and 1.5 mg/L) and evaluated. In terms of costs and time for the analysis, the A/O method was $2.44/sample (25-minute run time), Megazyme kits were $5.13/sample (15-minutes run time), and the BioSystems kits were $4.50/sample (10-minute run time). The A/O method offered accurate, timely, and cost-effective analysis of standard and wine samples. For standard SO_2 solutions, the Megazyme kits and the A/O method had the most accurate free and total SO2, whereas the Biosystems kits were accurate for total SO_2 but not free SO_2. As Noble increased in wine samples, the kits had struggled to have total SO_2 levels that aligned with expected values. While kits provide faster options for analysis of SO_2, the reliability of analysis differed per kit and sample type.

Time of Harvest and Grapevine Canopy Management Impact the Aromas in La Crescent and Frontenac Blanc Wines

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La Crescent and Frontenac Blanc are significant cold-hardy grape cultivars, making up a large portion of the planted acreage for cold-hardy white wine grapes. Despite their importance, there has been limited research on the optimal harvest parameters and vineyard practices that influence wine quality. This study applied three levels of canopy management to each cultivar, with fruit harvested at three different times, approximately one week apart. Wines were produced from all treatments, and basic wine parameters along with selected aromatic compounds were analyzed. The primary aromatic compounds in La Crescent wines were terpenes, while esters were predominant in Frontenac Blanc. Wine industry professionals evaluated the wines for the intensity of selected aromas. Overall, the timing of the harvest had more impact on the abundance of aroma compounds than canopy management.

Cold Hardiness Phenotyping in Hybrid Grapevine Utilizing Differential Thermal Analysis

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The development of cold-hardy interspecific hybrid grapevine has expanded grape cultivation into cold-climate areas. Cold weather events can damage the grapevine through bud death and trunk injury, leading to reduced yields and plant death. Phenotyping cold hardiness is challenging within a breeding program and lacks quantitative precision. Developing a standardized phenotyping protocol would enable efficient characterization of University of Minnesota grape breeding seedlings and selections. The objective of this study is to quantify low temperature exotherm responses of grapevine buds utilizing differential thermal analysis. We phenotyped 28 selections across the 2023-2024 and 2024-2025 winters from October through March on a biweekly basis. Differences in acclimation and deacclimation patterns between sampling times were observed in the low temperature exotherm readings, indicating that there may be differences in the genetic mechanisms for cold hardy responses. The winter of 2023-2024 was historically mild, with most days having highs above 0℃ and no bud injury was observed. The winter of 2024-2025 has been more typical for Minnesota, with a low of -28℃, multiple weather events below -20℃, and many daily highs being below 0℃. However, there have been multiple freeze-thaw cycles during the 2024-2025 winter, resulting in bud death as indicated by this method. K-means clustering analysis has determined three groups that differ in responses to winter fluctuations in temperature and are fairly consistent across years. These reference groups will be utilized to inform further breeding and selection decisions.

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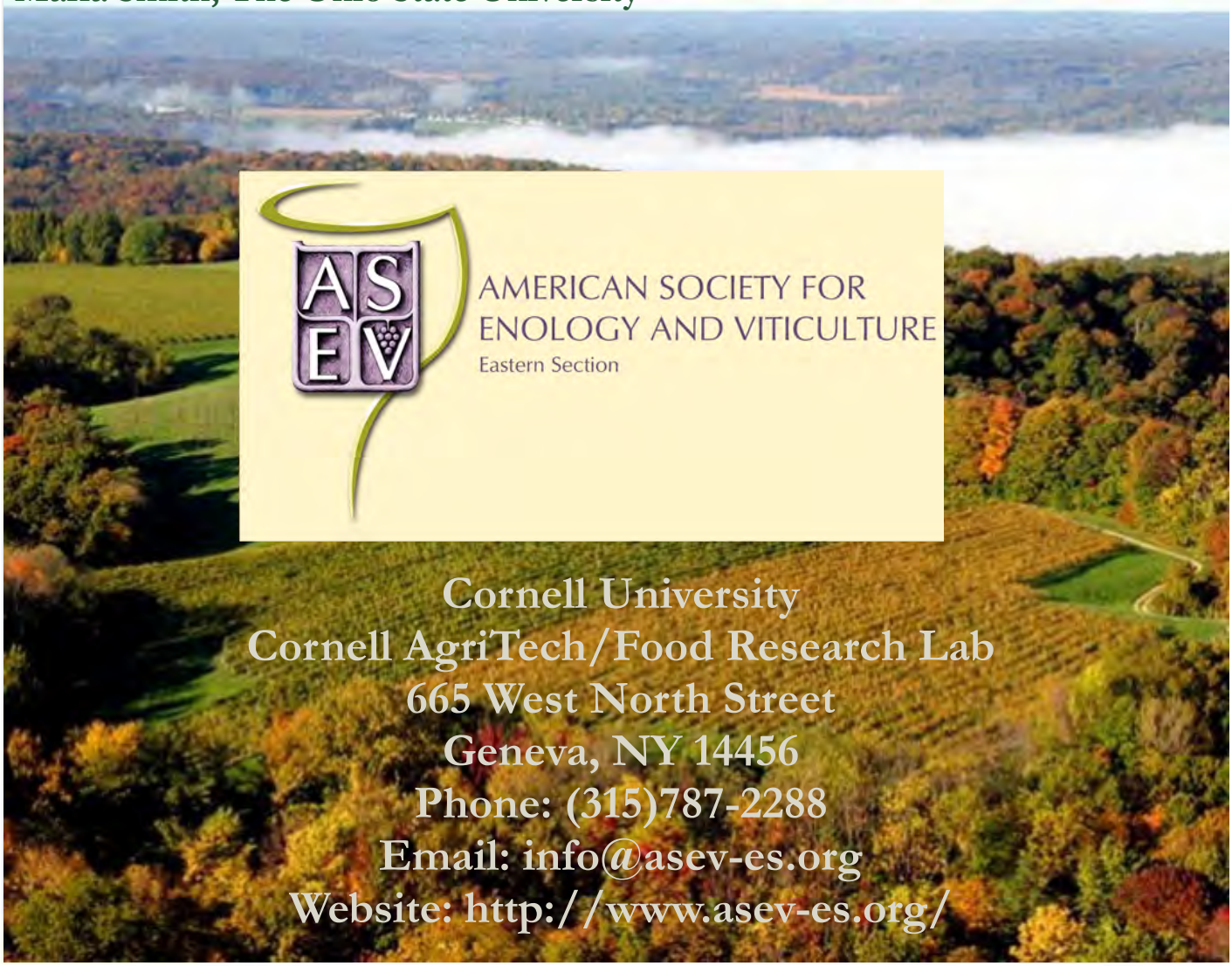

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