Committee Meeting in Davis, CA
Assistance to the California Department of Food and Agriculture Pierce's Disease/Glassy-Winged Sharp Shooter Board on Grapevine Viruses and Grapevine Disease

AGENDA FOR MARCH 4 OPEN SESSIONS AND SITE VISIT

MEETING VENUE
Christensen Room
UC Davis Foundation Plant Services
Foundation Plant Services
455 Hopkins Road
Davis, CA 95616

MONDAY, MARCH 4, 2024

OPEN SESSION (8:30 – 11:45 AM) – *Public welcome*

8:30 Welcome and Introductions; Overview of Open Session

Anna Whitfield, *Committee Chair*

8:45 Epidemiology of Grapevine Virus Diseases and Plant Disease Management

Neil McRoberts, *Professor of Plant Pathology, UC Davis; Director of the Western Plant Diagnostic Network*

Topics/questions to be addressed:

- *Describe the spatial and temporal spread of red blotch and leafroll in CA; Are there regional patterns within CA and beyond the borders of CA?*
- *How do biotic and abiotic factors, such as climate variations and viral mixed infections, contribute to the epidemiology of grapevine leafroll and red blotch, and how can they be integrated into modeling efforts for a more comprehensive understanding?*
- *Considering the dynamic nature of plant diseases, especially in vineyards, what challenges and considerations are involved in modeling the long-term effects of grapevine leafroll and red blotch, and how reliable are current models in making predictions for future disease prevalence and spread?*
- *Provide your insight into growers' perspective/understanding of red blotch and leafroll disease—Economic and social perspectives relevant to these diseases, willingness to adopt new technologies, and areawide management (barriers to adoption)*
- *Identify knowledge gaps in the biology and epidemiology of grapevine leafroll and red blotch that need to be addressed to provide understanding of the spread and control of these diseases.*
- *What are the key challenges with regards to extension – how is information translated; what research areas have the greatest potential for payoff in disease and vector control?*
- *What are the barriers to the adoption of management tactics by growers?*

9:30 Grapevine Red Blotch and Leafroll Disease Management

Monica Cooper, *Director & ANR Advisor (Viticulture), UC Cooperative Extension, Napa County*

Topics/questions to be addressed:

- *Describe the significance of red blotch and leafroll diseases to winegrape and table grape production in CA*
- *Are there regional differences or even site differences in importance and severity of red blotch and leafroll in California?*
- *Describe challenges to areawide pest management programs and considerations to keep in mind for future efforts*
- *What areas of red blotch and leafroll research and possible intervention points show promise for providing solutions for these vector-borne viruses? Describe challenges and considerations to keep in mind for future efforts (e.g., wine quality, social perception of technologies, grower concerns, etc.)*
- *What are the barriers to the adoption of management tactics by growers?*
- *Discuss any other aspects of red blotch and leafroll that you feel are important for the committee to take into consideration*

10:45 Coffee Break

11:00 Grapevine Breeding for Disease/Vector Resistance

Peter Cousins, *Grape Breeder, Winegrowing Research, E. & J. Gallo Winery*

Topics/questions to be addressed:

- *Significance of red blotch and leafroll diseases to winegrape production in CA*
- *Status of grapevine breeding for virus and vector resistance – best models and progress with red blotch and leafroll disease*
- *What are the major technical barriers to progress in grape breeding for virus and/or vector resistance; how to overcome these barriers? How important is the inoculation method when screening for resistance to viruses?*
- *Describe challenges to grapevine breeding for virus resistance and considerations to keep in mind for future efforts (e.g., wine characteristics, social perception of technologies, grower concerns, etc.)*
- *Discuss any other aspects of red blotch and leafroll that you feel are important for the committee to take into consideration*

11:45 Adjourn Open Session

OPEN SESSION (12:20 – 3:45 PM) – *Public welcome*

12:20 Welcome and Introductions; Overview of Open Session

Anna Whitfield, *Committee Chair*

12:30 Grapevine Red Blotch Virus and Vectors

Frank Zalom, *Distinguished Professor of Entomology, Agricultural Experiment Station Entomologist and Extension Specialist, UC Davis*

Mysore Sudarshana, *Research Biologist, USDA-ARS Crops Pathology and Genetics Research, Davis, CA*

Topics/questions to be addressed:

- *Status of virus-vector interaction research and what are the major questions that need to be addressed?*
- *Discuss GRBV transmission biology by Spissistilus festinus*
- *Discuss GRBV transmission ecology by S. festinus in different vineyard ecosystems*
- *Chemigation – grapevine uptake efficiency? When is the optimal time for chemical application? What does the future of red blotch and leafroll vector chemical control look like?*
- *Progress towards identification of additional (or all possible?) red blotch vectors and key challenges*
- *Identify areas where significant progress could be made towards understanding virus-vector biology and developing effective control strategies. What barriers need to be overcome?*
- *What are the most promising new technologies for vector control and challenges to be overcome for their application?*
- *Discuss any other aspects of red blotch and leafroll that you feel are important for the committee to take into consideration*

1:30 Impacts of GRBV on Grapes and Wine Composition

Anita Oberholster, *Cooperative Extension Specialist in Enology, UC Davis*

Topics/questions to be addressed:

- *Provide an update on your research studying the effect of red blotch virus on grapes and wine composition*
- *Describe progress towards mitigating grapevine red blotch virus impact on final wine composition, how does the industry mitigate red blotch impact?*
- *Discuss the important biotic and abiotic factors that may further complicate the effect of red blotch on grapes and wine and cultivar responses to virus*
- *Discuss any other aspects of red blotch and leafroll that you feel are important for the committee to take into consideration*

2:00 New Technologies for Virus Control

Protoplast-Mediated Gene Editing for Disease Resistance

David Tricoli, Manager, *Plant Transformation Facility, UC Davis*

Topics/questions to be addressed:

- *Provide an update on your research aimed at controlling vector-borne viruses impacting winegrapes*
- *Describe progress toward identification of targets for gene editing for virus resistance*
- *Describe progress towards efficient gene editing in grapevines*
- *Identify areas where significant progress could be made towards developing effective control strategies. What knowledge gaps barriers need to be overcome?*
- *Provide your perspective on the potential and acceptance of biotechnological approaches for virus and vector control*

- *Discuss any other aspects of red blotch and leafroll that you feel are important for the committee to take into consideration*

Grapevine Virus-Based RNA Interference (RNAi) Approaches to Target Grapevine Leafroll-Associated Viruses

Yen-Wen Kuo, *Assistant Professor of Plant Pathology, UC Davis*

Topics/questions to be addressed:

- *Describe your progress towards new virus and/or vector control using grapevine virus-based RNA interference (RNAi) approaches to target grapevine leafroll-associated viruses*
- *Provide an update on your research aimed at controlling vector-borne viruses impacting wine grapes*
- *Discuss the progress and potential for vector insect-specific viruses to control vectors and/or viruses*
- *Identify areas where significant progress could be made towards developing effective control strategies. What knowledge gaps and barriers need to be overcome?*
- *Provide your perspective on the potential and acceptance of biotechnological approaches for virus and vector control*
- *Discuss any other aspects of red blotch and leafroll that you feel are important for the committee to take into consideration*

3:00 Grapevine Phytosanitary Regulations and the CA Grapevine Registration and Certification Program

Maher Al Rwahnih, *Director, UC Davis Foundation Plant Services*

Topics/questions to be addressed:

- *Provide your perspective on the significance of red blotch and leafroll diseases to winegrape and table grape production and relative importance to the industry*
- *Describe the status of grapevine phytosanitary regulations (in general), challenges, and identify strategies that are working well and areas for improvement and provide the status of the CA certification program; certification/protocols/quarantine implemented at the state level; policies/protocols for bringing in planting materials from outside of CA*
- *How is the planting material supply chain (from FPS to Nurseries to Growers) working?*
- *Describe the major barriers to progress in the implementation of phytosanitary measures to address virus issues in winegrapes; provide your opinion on strategies to overcome these barriers*
- *How do international collaborations and agreements impact the implementation and enforcement of grapevine phytosanitary regulations?*
- *How do economic considerations and the financial impact of implementing phytosanitary measures influence the decision-making of grape growers?*
- *Are there specific regions or grape varieties that are more vulnerable to the economic and qualitative impacts of red blotch and leafroll diseases*
- *What are the major gaps in diagnostics for these viruses?*
- *What additional tool(s) and knowledge would be helpful for FPS with their efforts on clean plant production and to help growers implement phytosanitary standards?*
- *Are there specific knowledge gaps that, if addressed, could significantly improve the efficiency and accuracy of clean plant production programs?*

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3:45 Adjourn Open Session

3:50 Tour of FPS Facilities

- Visit diagnostic laboratory, meristem-tip culture laboratory, greenhouse, and nursery areas.
- Travel to Classic Foundation Vineyard (1 mi from FPS), currently GRBV-free and used to distribute material to nurseries, vineyards, and other growers.
- Travel to Russell Ranch Vineyard (6 mi from Davis), previously used for grapevine material distribution and now home to GRBV sentinel vine research.

5:30 End of FPS Tour

SPEAKER BIOS

Maher Al Rwahnih currently serves as Director of the UC Davis Foundation Plant Services (FPS). Maher has developed an expertise in the diagnosis and control of infectious diseases of fruit trees and grapevines, specializing in the etiology, molecular characterization, and molecular diagnostics of virus diseases in those crops. He has more than twenty years' experience in developing diagnostic tools for the detection and identification of agents of those virus diseases. He pioneered the characterization of plant viruses in FPS crops such as grapevines, roses, and fruit and nut trees through the application of a novel process known as high throughput sequencing (HTS) and bioinformatics. In the regulatory arena, Maher has collaborated closely with colleagues at the USDA-APHIS Plant Protection and Quarantine Program and at the California Department of Food and Agriculture Registration & Certification Programs. He provides technical support and advice on the adoption of HTS technologies for applications in routine certification testing. He also provides input to scientists internationally on the development of standards for use of HTS in plant diagnostics. Since 2009, he has taken an active role in the National Clean Plant Network, an organization of experts and scientists from clean stock programs throughout the United States dedicated to ensuring the availability of clean plant material to industry stakeholders.

Monica Cooper joined UC Cooperative Extension (UCCE) in Napa County as a Farm Advisor (Viticulture) in April 2009. Educated as a Plant Doctor at the University of Florida, she has multidisciplinary training in plant pathology, entomology, soils, and plant science that she draws upon to help growers diagnose vineyard problems. Her applied research and outreach programs provide evidence-based technical information to the vineyard industry. Her research interests include disease epidemiology, pest management, labor issues affecting farmworkers, factors affecting adoption of management practices in the agricultural industry and optimizing extension delivery through peer-learning networks and educational resources. Fluent in Spanish, she also offers educational programming to farmworkers. Her achievements have been recognized with the American Society for Enology and Viticulture (ASEV) Extension Distinction Award (2019), the 9th International IPM Award of Recognition (2018), the Vintage Report Innovation Award (2016), and the UC ANR Distinguished Service Award for Outstanding Team (2015/2016). An active member of ASEV, she serves as an associate editor of the society's journals.

Peter Cousins is a grape breeder and Senior Principal Scientist at E. & J. Gallo Winery. The grapevine improvement program he leads focuses on the breeding, introduction, and evaluation of proprietary wine grapes varieties and selections with enhanced quality and productivity. Before joining E. & J. Gallo Winery, Peter was grape rootstock breeder and geneticist with the United States Department of Agriculture, Agricultural Research Service, based at the Cornell University campus in Geneva, New York, for more than 12 years. In that role, he bred and introduced eight grape varieties, including rootstocks and genetics research varieties. He earned his doctorate in genetics at the University of California, Davis studying grapevine improvement, botany, evolution, and pest resistance and his bachelor's degree in biological sciences at Stanford University, and he studied agriculture and biology at Modesto Junior College.

Yen-Wen Kuo is an Assistant Professor of Plant Pathology at the University of California, Davis, specializing in plant virology. Her research focuses on developing viral vectors, RNA interference, and exploring virus-host

interactions, with a specific emphasis on diseases affecting citrus and grapevines, supported by current funding. Dr. Kuo's impactful research contributions have been highlighted in numerous peer-reviewed journals. She is an active member of the American Society for Virology.

Neil McRoberts is a Professor of Plant Pathology at the University of California, Davis and the director of the Western Plant Diagnostic Network, which comprises plant pest diagnostic labs and detection specialists in ten states in the western region of the United States, and two U.S. territories in the Pacific, and currently the NPDN National Executive Director. Neil is a plant disease epidemiologist and theoretical biologist. He studies the interaction between plant diseases and the other components of agricultural and natural plant communities and is particularly interested in the emergence of robust statistical properties at different scales in agriculture and the feedback between human decision making and management actions and other features of system dynamics. His work draws on a wide range of component disciplines from the natural and social sciences.

Anita Oberholster is Vice-Chair and Professor of Cooperative Extension at the Department of Viticulture and Enology in UC Davis. In her current position, she focuses on continuing education for the grape and wine industry, while her research program concentrates on current issues in the grape and wine industry. Dr. Oberholster's research focuses on two main parts: firstly, the influence of both viticulture practices and environmental factors on grape ripening and composition and related wine quality; the impact of disease pressure and mechanization are also investigated. The second core research focus is investigations to determine the influence of different vinification practices on wine composition and quality. Oberholster completed her Ph.D. in wine sciences at the University of Adelaide, in Australia in 2008. Prior to moving to UC Davis, she was a researcher in the Department of Viticulture and Oenology at Stellenbosch University in South Africa.

Mysore Sudarshana is a Research Biologist at the USDA-ARS Crops Pathology and Genetics Research Unit in Davis, CA. His research interest includes biology and management of grapevine red blotch disease and graft union disorders of perennial crops. His projects include both applied and molecular biology with emphasis on improved detection and characterization of viruses. He received his Ph.D. in plant science with a major in plant pathology in 1995, from the University of Idaho, Moscow, ID. Prior to joining USDA-ARS in 2008, Dr. Sudarshana was a post-doctoral researcher in Plant Virology and subsequently an Assistant Researcher at the Western Institute for Food Safety and Security at UC Davis (2005-2008).

David Tricoli conducts research on plant transformation and genome editing methodologies across a wide range of agricultural plants. A major focus of his research is on protoplast-mediated genome editing of Vitis species for improved disease and quality traits. He also conducts plant cell biology research in micropropagation, tetraploid plant generation, microspore culture, and dihaploid production. David in a co-inventor on the patent application for “Methods for improved regeneration of transgenic plants using Growth-Regulating Factor (GRF), GRF-Interacting Factor (GIF), or chimeric GRF-GIF genes and proteins.” He is also the applicant for a patent entitled “Protoplast Isolation and regeneration of plants” which describes his grape protoplast genome editing methodology. He also is co-holder of the patents for “Transgenic plants expressing DNA constructs containing a plurality of genes to impart virus resistance” and “Transgenic plants exhibiting heterologous virus protection.” He participated in the development and commercialization of two transgenic virus resistant squash which have been sold commercially since 1995, and in the development and release of Pixie, a dwarf grapevine with rapid cycling characteristics that is now used in teaching and in genetics, pathology, and physiology research.

Frank Zalom is a Distinguished Professor of Entomology at the Department of Plant Pathology and Nematology at UC Davis where he teaches Arthropod Pest Management and conducts IPM research on tree, vine, small fruit, and vegetable crops. Frank provides integrated pest management (IPM) leadership nationally and served as co-chair of the Association of Public and Land-grant Universities (APLU) National IPM Committee from 1999-2015, IPM representative to the Experiment Station Committee on Organization and Policy (ESCOP) Science and Technology Committee since 2003, and as Panel Manager for USDA’s Western Region IPM Competitive Grants Program Manager from 2004-2014 and USDA’s 1890 Capacity Building Grant Program from 2022 to present. He served on the USAID Board of Directors for the IPM Collaborative Research Support Program (CRSP) from 2001-2005. He

was Director of the UC Statewide IPM Program from 1986-2002, receiving a Joint Resolution from the California State Legislature upon stepping down from that position honoring his ‘contributions to California agriculture’. Frank is a Fellow of the California Academy of Sciences, the Entomological Society of America (ESA), the American Association for the Advancement of Science (AAAS), and the Royal Entomological Society (London). He also served as ESA president (2014), Editor-in-Chief of ESA’s Journal of Economic Entomology (2018-2023), and holds ESA's highest honor (Honorary Member, 2021), and has authored 376 journal articles or book chapters.