Glacier Canyon Lodge at Wilderness Resort. 45 Hillman Rd, Wisconsin Dells, WI 53965

Day 1 (Wed January 15, 2025)

7:30-10:30, Tundra. **Pesticide Applicator Training-J. Kampa**

Registration deadline 12/31/2024. To register for the training, click "training classes", choose the date and location you want, and add it to your cart. Fruit Crop Private Applicator Training To purchase a Training Manual: https://patstore.wisc.edu/secure/collection/private/38 For questions, please contact Jordan Kampa at Jordan.kampa@wisc.edu or (414) 399-0373.

8:00-4:15, Trade Show Area. **WSCGA 2024 Trade Show**

10:00-10:15, Wilderness. **Opening Remarks-G. Holley**

10:15-10:45, Wilderness. **Award Presentations-J. Van Wychen**

10:30-completion, Tundra. **Pesticide Applicator Test-J. Kampa**

10:45-11:15, Wilderness. **Cranberry Institute Update-M. Dubuc**

11:15-11:30, Wilderness. **WARF Licensing & New Varieties-E. Bauer**

Emily Bauer will describe the new varieties coming from UW, as well as how to license them and where to buy vines.

11:30-1:00 **Lunch in Trade Show Area-Sponsored Break-Rick Mowrer, Texas Boom Company**

1:00-1:30, Wilderness. **Legislative Update-J. Lamb**

Jordan Lamb will provide an overview of WSCGA's state advocacy program and a preview of the 2025-26 Wisconsin State Legislative session.

1:30-2:15, Wilderness. **WSCGA Annual Meeting-J. Van Wychen**

2:15-2:30, Wilderness. **Nutrient Removal in Harvested Material-Dustin Sawyer, Amaya Atucha, Charles Glenn**

Understanding the nutrient flux of a cropping system is important when trying to make effective fertilizer application decisions. Here we measured nutrient removals through harvest of four different cultivars at five different marshes to get a preliminary look at an important part of the nutrient flux in cranberry production, and which variables can impact it. Initial results show that nutrient removal is highly correlated to cultivar in this limited dataset. This presentation shows that there is an interesting story in the data and that

further study is warranted if we are to gain a fuller understanding of nutrient removals through harvest.

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2:30-3:30, **Break in Trade Show Area-Sponsored Break–Business Succession Planning-Stacy Burgau and Greg Holmgren**

3:30-3:45, Wilderness. **Internal Structure & Firmness of Cranberries-Dr. S. Ikeda**

This presentation will provide an overview of our recent investigation on the internal structure of cranberry fruits and its relationship with the fruit firmness. X-ray micro-computed tomography (CT) imaging was performed to obtain quantitative information on the internal structure, such as porosity. Numerous micrometer-sized pores were observed within the flesh. The total porosity was negatively and positively correlated with density and firmness, respectively.

3:45-4:00, Wilderness. **Variety-Dependence of Phytochemical Contents in Cranberries-T. Komatsu (Ikeda Lab)**

The phytochemical composition of 17 fully ripened cranberry varieties was investigated, with a focus on anthocyanins, proanthocyanidins, total polyphenols, polymeric colors, and titratable acidity. Results revealed variety-dependent differences in the contents of anthocyanins, proanthocyanidins, and polyphenols. Three varieties with the highest and lowest proanthocyanidin levels were identified for further investigation into the effect of oven-drying on the phytochemical composition.

4:00-4:15, Wilderness. **Cold Hardiness Prediction Model to Reduce Cranberry Yield Losses-Dr. North, Dr. Kovaleski, A. Atucha**

Cranberry buds respond to environmental cues to coordinate the development and release of cold hardiness mechanisms during the dormant season. In this study, we evaluated cold hardiness of ‘Stevens’ apical reproductive buds using control freeze tests with (1) visual estimation of tissue browning; and (2) electrolyte leakage. Validation of electrolyte leakage as a cold hardiness assessment technique for cranberry buds will expand and improve cranberry cold hardiness research opportunities because it is more efficiently scaled and provides an objective measure of injury, which will allow the inclusion of more measurement repetitions, more experimental sites, and more cultivars. We have begun using our dataset of cold hardiness measurements to develop a cold hardiness prediction model, which could inform cold stress mitigation management and could forecast key spring phenological development stages.

4:15-4:30, Wilderness. **Wisconsin Cranberry Research & Education Foundation Update & Research Station Progress-G. Holley**

4:30-5:30. **Social Hour**

Day 2 (Thur January 16, 2025)

8:00-9:00, Wilderness. **Interactive Grower Surveys-UW Extension**

Interactive grower surveys to share information on horticulture, plant pathology, entomology, weed science, and educational priorities. Please bring a cell phone or tablet to participate.

9:00-9:15, Wilderness. **2024 Disease Trends: Cranberry Viruses + Upright Dieback-Dr. L. Holland**

This presentation will cover 2 important diseases we saw an uptick in this past growing season - viruses and upright dieback. We will cover diagnosis and management of these diseases.

9:15-9:30, Wilderness. **Pathogen Presence in Early Cranberry Bed Establishment-Ana Maria Vazquez Catoni (Holland Lab)**

This talk elaborates on a two-year investigation into presence of cranberry fruit rot fungal pathogens in early cranberry bed establishment. Over 41% of CFR-associated fungi are found in 100% of the asymptomatic samples originating from plant tissue from established and young beds. These results suggest that propagative material may harbor dormant infections of these pathogens. This work sheds light on an important, yet under looked, aspect of cranberry production with the potential of optimization.

9:30-9:45, Wilderness. **Enhancing Cranberry Cultivation Using Multispectral and Thermal Remote Sensing: A Comparative Analysis of Satellite, Aircraft, and Drone Platforms-R. Alpers, D. Babu (Mura Lab)**

In cranberry farming, efficient crop health monitoring is essential for maintaining productivity and sustainability. This study evaluates three primary remote sensing methods - satellites, aircraft, and drones based on cost, accessibility, spatial coverage, and stress identification. These technologies employ advanced multispectral and thermal imaging sensors that quickly detect issues to capture detailed images of the cranberry beds. Analyzed with developed vegetation indices, these images identify stress areas before they become visible, providing results within 24 to 48 hours for prompt action. By integrating these remote sensing methods, cranberry farmers can detect potential issues early , enhancing resource efficiency and promoting sustainable practices that lead to increased yields.

9:30-10:00, Tundra **Vetting Media Inquiries and Safe Media Practices-H. Herline**

This presentation is designed to help Wisconsin cranberry growers manage media inquiries while protecting both their farm's reputation and the industry's image. Using real-world scenarios and proven communication techniques, WSCGA's communication manager will outline methods for

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evaluating media requests, delivering consistent messaging, and avoiding common pitfalls. Growers will gain practical tools to navigate media interactions effectively, ensuring their operations and the cranberry industry are represented positively.

9:45-10:00, Wilderness. **Potentially Beneficial Bacteria from Cranberry Plants-J. Rohde, A. Atucha, Dr. Mura**

Bacteria live with plants across diverse ecosystems, including horticultural settings like cranberry beds. Many of these bacteria benefit plant growth by increasing nutrient availability and decreasing stress. This presentation will discuss the specific beneficial activities of some microbes, such as phosphorus solubilization, auxin producing, and sulfur oxidizing (soil acidification,) as well as future research directions.

10:00, **Break**

10:15-10:30, Wilderness. **Isolation and Evaluation of Beneficial Fungal Endophytes and Mycorrhizae in Cranberries-Dr. J. Mura**

Most terrestrial plants have microbial symbionts, including fungi and bacteria, which assist in nutrient acquisition and stress adaptation. The presentation will address the isolation and characterization of fungal ericoid mycorrhizae and endophytes from different cranberry ecosystems. Additionally, we will present how these fungal mycorrhizae and endophytes improved the growth of cranberry roots and shoots in greenhouse and hydroponic experiments.

10:30-10:45, Wilderness. **Do supplemental wildflower plantings affect visitors to cranberry flowers? A study using Automated Pollinator Camera Traps-O. Bernauer, J. Crall**

We investigated whether adding pollinator gardens to cranberry marshes impacted the diversity or abundance of cranberry flower visitors. To document flower visitors, we deployed pollinator camera traps on four marshes with pollinator gardens during bloom in 2024. Camera traps were placed in the pollinator garden, in cranberry near the garden, and in cranberry far from the garden. Pollinator gardens had the highest diversity of flower visitors and frequency of visitation. While honey bees were the dominant visitor to cranberry both close and far from the pollinator gardens, cranberry

flowers near the pollinator gardens were visited by wild insects more often (36% of visits close to vs. 3% of visits far from pollinator gardens).

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10:15-10:45, Tundra. **Wolves in Sheep's Clothing: Best Practices in Cybersecurity-G. Holley**

This presentation is designed to help Wisconsin cranberry growers better identify potential online scams. Last year American consumers lost over $12.5 billion to cybercrime which is a 22% increase from the previous year. Many times, these crimes are NOT targeted at large corporations, but rather small businesses who do not have the resources to create their own IT Teams, firewalls, etc. My presentation will address common hallmarks of web scams and also discuss reasonable actions when you do suspect a potential threat.

10:45-11:00, Wilderness. **In Vitro Fungicide Sensitivity Testing-E. Lozano (Holland Lab)**

The cranberry industry relies on two FRAC groups for chemical control of cranberry fruit rot pathogens. FRAC 11 fungicides are labeled as high risk for resistance development and FRAC 3 are labeled as medium risk. This work tested the current status of fungicide sensitivity of Colletotrichum acutatum species complex to 3 of the most commonly used fungicides in Wisconsin. Thirty isolates were collected from across the state from marshes that used anywhere from 0 fungicide applications per year to those that use up to 4 applications per year. Fungal isolates were exposed to 5 different concentrations of fungicide in vitro and the effective concentration to inhibit 50% of growth was determined. Preliminary results indicate that as few as 2 applications per year can lead to fungal isolates with reduced sensitivity to fungicides.

11:00-11:30, Wilderness. **Grower Panel onNitrogen Timing NOPP at Cranberry Creek-N. Hanson, A. Bires, A. Atucha**

Two years of data comparing 4 nutrient application timings are presented for Mullica Queen and Stevens. Panelists will discuss the process of engaging in Nitrogen Optimization Pilot Program (NOPP) research as well as the outcomes from this 2-year study. Questions from the audience are welcomed.

11:30-12:30. **Lunch.**

12:30-1:15, Wilderness. **Grower Panel on Application Drone Use-A. Pitlik, T. Walker**

Growers who have been using drones as their primary or sole application method in recent years discuss their management approaches and observations. Questions from the audience are welcomed.

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1:15-1:45, Tundra. **Fuel & Lubricant Changes- R. Grimm**

Are you aware of how changes in fuels and lubricants will impact your cranberry business in the future? What does the industry anticipate for government fuel standards in the coming years? In this session, Rick Grimm, Insight FS Area Energy Manager, will discuss new fuel technologies, upcoming government mandated fuel standards, and what to be aware of as you dig into your future fuel and lubricant needs.

1:15-1:30, Wilderness. **Cranberry Flower Detection Project Update (BerryBot)-J. Jewison (Zalapa and Digman Labs)**

Yield prediction is important for breeding programs aiming to improve yield as well as for cranberry production for harvest planning and processing. Flower development and fruit set are important components of cranberry yield that can be utilized to predict yield. Therefore, in this study flowering and fruit set were characterized using an eight session imaging time series, taken of 266 cranberry individual breeding plots. The time series included different flowering and fruit set stages, and the images were analyzed with machine learning to track flowering counts and timing as well as fruit set and development. This flowering and fruiting dataset along with ground truthing yield information will allow the creation of a model to predict cranberry yield. The images were collected with an automated ground based robotic imaging platform, which decreases the sampling time and effort as well as increasing the data sampling rate. The resulting images provide a wealth of phenotypic information which is extracted by annotating through identification of flowers manually, and using the information to train a machine learning model on the Roboflow platform. This model can then be used either in-field during image capture or on stored images to create a database of flowering counts and timing as well as fruiting. Analysis of this early data shows a difference in flowering counting and timing between plots and correlation between flowering concentration and fruit set. In the future, the system will allow comprehensive year-round yield-related trait data collection based on imaging, saving growers and researchers time and money and allowing yield prediction for selection and breeding as well as harvest planning. Finally, the system allows modular implementation of additional sensors carried on the platform that will provide additional potential uses in many areas of crop management from weed and pest management to phenotypic selection for cranberry breeding purposes.

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1:30-1:45, Wilderness. **Cranberry Yield Monitoring Project Update-A. Guerrero Aguirre (Zalapa and Digman Labs)**

In cranberry breeding programs, yield is a critical factor for genotype selection, alongside other fruit quality variables such as fruit size, firmness, and color. The Wisconsin Cranberry Research Station (WCRS) in Black River Falls WI houses ~5,000 diverse cranberry genotypes useful for breeding. The characterization of yield manually using the traditional square plot method to measure yield across such a large collection is time-consuming, costly, and prone to inaccuracies as reps to reduce error are not possible. Moreover, cranberry yield is a crucial metric for farmers, enabling them to plan the infrastructure needed for the harvest season effectively. To address these challenges, we are exploring the use of microwave reflectance techniques for yield estimation.

In 2023 and 2024, we collected data from the WCRS and two growers housing breeding plots at the marshes [1] [2] using a microwave resonator to measure yield within a one-square-foot area. We also took images of the visible yield and fruiting characteristics as well as the crop temperatures. Preliminary results show a strong correlation between cranberry yield and the peak amplitude of the microwave sensor under field conditions; the regression model can explain up to 75% of the variation in yield. This work aims to support the cranberry breeding program at USDA-ARS in UW-Madison by integrating yield prediction into an automated phenotyping system.

In the long term, this technology will benefit farmers by providing a predictive yield estimation system, allowing for more informed planning and resource allocation. This study represents significant advancement, as it replaces labor-intensive manual measurements with a cost-effective and scalable solution, reducing expenditure for researchers and farmers. Furthermore, the application of this methodology could facilitate the development of time-series data collection for cranberry growth, enabling the identification of additional important crop traits**.**

1:45-2:15, Wilderness. **Firmness Methodology-H. Lopez Moreno (Zalapa Lab)**

Fruit texture is a key trait ensuring the economic sustainability of the cranberry industry as it directly influences storage potential, processing efficiency, and consumer preferences. Until now, a reliable and standardized method for evaluating cranberry firmness has not been available. Thus, we developed a texture evaluation methodology specifically tailored for

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cranberry to accurately assess fruit quality for sweetened dried cranberry (SDC) production. We examined the key methodologies, texture traits, parameters, and conditions that are crucial to achieve a correct and efficient measurement of texture in cranberry fruits. Double compression, single compression, puncture, shearing and Kramer shear cell methodologies were successfully implemented in cranberry resulting in a set of useful cranberry traits. Relevant information about factors that affect the performance of texture measurements such as optimal sample size, storage time, fruit texture-size correlation, fruit temperature and orientation, optimal speed/strain combination, and the effect of probe diameter was investigated. To further develop a standard methodology to measure texture in cranberries, we conducted an additional comparative analysis of 22 textural traits using five different methods under both harvest and post-harvest conditions in 10 representative cranberry cultivars. A set of textural traits from the 10%-strain compression and puncture methods were identified that differentiate between cultivars primarily based on hardness/stiffness and elasticity properties. The complementary use of both methodologies allowed for a detailed evaluation by capturing the effect of key texture-determining factors such as structure, flesh, and skin. Furthermore, the high effectiveness of this approach in different conditions and its ability to capture high phenotypic variation in cultivars highlights its great potential for applicability in various areas of the value chain and research. Therefore, this study provides an informed reference for unifying future efforts to enhance cranberry fruit texture and quality. The adoption of a standardized cranberry texture methodology by research laboratories and the industry will unify breeding and genetics research, improve fruit evaluation practices for processing, and result in value-added product improvement for growers and consumers.

1:45-2:30, Tundra. **Truck Preventative Maintenance-C. Labarge, Mid-State Truck Service**

We will discuss preventative maintenance for trucks, Department of Transportation inspections, in-depth repairs, and more. Chris spent 17 years as a technician with Mid-State, and has now been service manager for 6 years. Session will be 30 minutes of discussion and 15 minutes for questions and answers.

2:15-2:30, Wilderness. **Drone-Based Phenological Monitoring of Spring Leaf Coloration in Cranberry Breeding Populations-A. Maule (Zalapa & Mura Labs)**

Cranberry production faces significant challenges during spring, when early warming followed by late frosts can severely damage floral buds and reduce crop yields. Traditional frost protection methods like flooding and sprinkler irrigation are complex and resource intensive. Using genetics to select

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cultivars that exhibit delayed spring bud development is one resource to reducing frost management costs and complexities. The goal is to identify "developmental achievers" - cultivars that demonstrate two critical traits: delayed initial spring development to avoid early bud damage, and rapid development and growth once the critical frost period has passed. Drone RGB images were captured from three cranberry breeding populations from 2018 to 2020, along with targeted subsampling of upright leaves to assay chlorophyll and anthocyanin levels. A model of RGB image indices was built to predict canopy anthocyanin levels as a proxy for spring leaf and bud phenology. Predicted anthocyanin levels of breeding plots over multiple spring timepoints enabled time-series analysis and development of a quantitative empirical score of "developmental achievers". This research provides an efficient and novel way to elucidate the genetic parameters of late spring developing cultivars, with future work focusing on making cultivar selections from assessed breeding plots. Furthermore, the methods produced herein will provide meaningful insight in the assessment and selection of "developmental achievers" from the advanced BerryBot phenotyping platform, a joint project of the Digman and Zalapa labs.

2:30-2:45, Wilderness. **Grower Survey Findings-C. Mezera (Holland Lab)**

This survey set out to understand cranberry growers' perceptions of different industry resources, management tools, and research topics centered around pest, pollinator, and disease management. These responses varied based on the management position, amount of production and industry experience, educational background, and involvement in grower meetings of respondents. Overall, growers reported experience being the most important factor when making management decisions, and other producers were considered a key resource informing these decisions. Key takeaways from the survey, as well as potential conclusions in the context of UW programming, will be discussed in this session.

2:45-3:00, **Break.**

3:00-3:30, Tundra. **Irrigation System Design for Cranberries-A. Reitz, F. Carmona, H. Krutzik. Roberts Irrigation.**

Overview of general irrigation design, pumps, VFDs, telemetry and automation.

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3:00-3:15, Wilderness. **Impact of Shade and Fungicides on Fruit Rot Development-E. Pozas Rodriguez (Holland Lab)**

Cranberry fruit rot is currently controlled by fungicide applications at the beginning of the season during bloom. However, resistance to fungicides by pathogens and regulatory changes regarding fungicide use motivate us to evaluate alternative cultural practices. We evaluated the use of protective shade in a 'Mullica Queen' bed during 2023 and 2024 to investigate whether it could serve as an alternative to fungicides. Our data show that with 30% shade, rot levels were comparable to the untreated control. We further investigated protecting the berries from sunlight using berry protectants that achieved rot levels as low as those observed with fungicide applications. Protection of the berries from sun radiation is a promising alternative to reduce fungicide application and maintain low levels of rot.

3:15-3:30, Wilderness. **The Effect of Long-Term and Acute Heat Stress Event on Fruit Rot-Dr. J. Bolivar-Medina, Dr. Mura, A. Atucha**

This talk reviews the first year of data from a cranberry heat stress study, examining short- and long-term impacts. Results on heat stress effects on fruit rot incidence, yield, and fruit characteristics will be presented.

3:30-3:45, Wilderness. **Water Quality Sampling & Management-Dr. S Hall**

This presentation will introduce the topic of water quality in cranberry production systems, with a focus on nitrogen and phosphorus. I will describe existing and novel practices that may decrease nutrient losses and opportunities for UW-grower collaboration on this topic.

3:45-4:15, Wilderness. **2024 WI Cranberry Insecticide Screening Program Results-Dave Jones, Sr. Agricultural Scientist – Ocean Spray Cranberries, Inc.**

This year's WI Cranberry Insecticide Screening Program trials focused on a.) evaluating Altacor alternatives for cranberry fruitworm and sparganothis fruitworm management b.) vetting registered and novel synthetic insecticides for the control of cranberry flea beetle and c.) evaluating entomopathogenic nematode species for both initial control of cranberry flea beetle and for the potential of multi-year control. Altacor continues to serve as the foundational material for cranberry fruitworm and sparganothis fruitworm management in the state of Wisconsin, but 2024 trials demonstrated that two applications of Altacor are not necessary in low to moderate pressure scenarios and a second application of Altacor can either be skipped or rotated with nonbee safe materials after bees exit the field once bloom is over to take pressure off of the material and avoid seeing it used two times per year, every year. SpearLep continues to be an inconsistent performer in these trials over the past several

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years, likely due to issues with rain-fastness of the product. Seven insecticides were evaluated for flea beetle control in lab assays in 2024, with several currently registered materials and one unregistered material (anticipated registration in '26) also showing good results. Spinetoram (Delegate or Radiant SC) provided strong acute toxicity in these lab assays and was subsequently tested in the field in two separate trials during both peak adult emergence in early August and near the end of adult emergence in the final week of August, showing 6-7 days of control during peak emergence in a severe infestation scenario and sustained control that did not require re-application when applied at the end of emergence in late August. Capsanem (Steinernema carpocapsae) applied in field trials both three times at 500 million nematodes/acre and four times at 375 million nematodes/acre in June provided season long control of cranberry flea beetle without any additional synthetic insecticide at all three test locations, and all Capsanem beds treated in 2023 but not in 2024 showed a second full season of control without any additional applications in 2024, demonstrating the potential for a minimum of two full seasons of economic control with one year of Capsanem applications. Another entomopathogenic nematode product, Entonem (Steinernema feltiae) was tested against both an untreated control and Capsanem but did not show any separation from the untreated control, while Capsanem performed at the same high level seen over the past several years of plotwork testing.

4:15-4:30, Wilderness. **2024 Fungicide Screening Trials-Dr. L. Holland**

This presentation will review the findings of 2024 fungicide screening trials conducted at the Wisconsin Cranberry Research Station.

4:30-4:45, Wilderness. **Cranberry Integrated Weed Management Research-Dr. J. Colquhoun**

Weeds such as the St. Johnswort species and moss continue to spread among cranberry marshes and will require an integrated management approach that utilizes multiple strategies, such as treatment thresholds, invasion prevention and targeted herbicides. This presentation will offer an update on research in each of these areas, with a focus on strategies that can be adopted on the marsh in the near future, along with a futuristic look at novel tools that have potential uses in cranberries.