ISSUE 1
APRIL 2024

SAME PROJECT

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SAME OBJECTIVES

The long-term goals of SAME are to optimize models for site-specific cranberry fruit rot control recommendations, promote the adoption of integrated management methods on commercial beds, develop best management practices, and ultimately reduce fruit rot while enhancing fruit quality.

1. ***Assess fruit rot pathogen populations across the major US production regions and monitor their sensitivity to fungicides.***
2. ***Evaluate the impact of environmental stressors and fertilizer on fruit chemistry and fruit rot symptom development.***
3. ***Identify genetic resources for fruit rot resistance and stress tolerance to guide breeding.***
4. ***Develop predictive models for fruit rot management and examine the economics of cranberry fruit rot management.***
5. ***Distribute tailored solutions to growers throughout the US through extension networks and training.***

This initiative represents an important advancement toward sustainable cranberry production and the enhancement of fruit rot management practices within the industry.

WELCOME TO SAME

Welcome to our newsletter! We're excited to connect with you and share the latest developments from the SAME project.

Made possible by funding from the USDA NIFA Specialty Crops Research Initiative, the SAME project team is dedicated to conducting multidisciplinary research on cranberry fruit rot and translating our findings to benefit cranberry stakeholders like you.

Dr. Leslie Holland
Project Director
University of Wisconsin-Madison

SAME represents a national effort aimed at comprehensively tackling the elements that contribute to the development of cranberry fruit rot, and it will offer decision support management options to cranberry growers.

Fruit rot is identified as the most important research need of cranberry growers across all U.S. growing regions. Cranberry fruit rot (CFR) has been a major factor reducing yields since the first commercial beds were planted in the late 1800s. Despite the implementation of CFR management protocols, losses of up to 30% or more remain common in regions with high disease pressure.

In historically less disease-prone areas like Wisconsin, severe fruit rot outbreaks typically occur sporadically and are linked to climatic events. A survey conducted by Project Director, Holland and colleagues in 2021, revealed that 83% of North American cranberry growers experienced fruit rot losses within the past 5 years. Alarmingly, less than half (46%) of these growers deemed existing fruit rot management strategies effective.

Growers identified various factors contributing to increased fruit rot incidence, including weather conditions, canopy moisture retention, susceptibility of certain varieties, and overheating. In recent years, the fruit rot disease complex has posed even greater challenges, with reported yield losses ranging from 50 to 100%. Consequently, growers apply 2 to 5 fungicides per season to ensure marketable harvests.

Our project team consists of University and USDA ARS Principal Investigators, along with valuable input from our Extension Network and Advisory Panel. Together, we're committed to addressing the challenges faced by cranberry growers and finding innovative solutions.

In this newsletter, you can expect updates on our research progress, insights from our team members, and contributions from our collaborators. Stay tuned for more updates later this season!

WHAT IS SAME?

The Systems Approach for Managing the Expression (S.A.M.E.) of cranberry fruit rot (CFR) is a comprehensive, interdisciplinary project designed to develop effective management strategies. This collaborative project addresses five critical knowledge gaps:

1. There are no predictive models to identify high risk conditions and growers are often caught off guard when higher incidences of CFR occur.
2. As broad-spectrum fungicides are lost, growers rely more heavily on at-risk fungicide chemistries.
3. Due to the endophytic nature of these fungi, it is assumed that most fruits are infected, however not all infections lead to the development of rot. Therefore, we propose that environmental stress factors may lead to the expression of fruit rot.
4. Current selections and germplasm of cranberry show enhanced fruit rot resistance, however, the mechanism for genetic resistance to fruit rot is unknown.
5. A better understanding of the trade-offs between CFR management practices and what best incentivizes growers to proactively manage CFR will lead to adoption of effective CFR control.

This project aims to examine the components of the disease triangle (pathogen, host, environment) to enhance our understanding of the factors influencing cranberry fruit rot disease. The insights gained from this research will be disseminated to stakeholders and industry partners through webinars, the SAME newsletters, extension meetings, and our project website.

RESEARCHER SPOTLIGHT

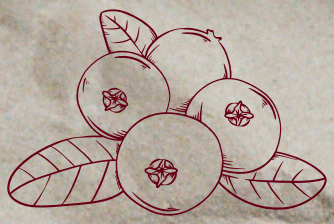
BREANNE KISSELSTEIN

What is the project you're working on for SAME about?

My objective is to understand how different cranberry cultivars respond to environmental stress and fruit rot infection. Right now, I am analyzing data from our established multi-location cranberry evaluation trials located in NJ, OR, WA, WI, and British Columbia. This data includes important traits such as fruit yield, weight, quality, and fruit rot severity, as well as weather data. By looking at how these cultivars are growing year after year in diverse regional climates, we can identify when these valuable traits are a result of genetics and stable across different environments. The goal is to identify which of these cranberries are genetically superior and would be valuable for breeding future commercial cultivars. And once I make more headway on that front, I'm very excited to work on developing in-season fruit rot prediction models!

What is something you like or find most interesting about your work?

My favorite part of this work so far has been learning more about cranberry cultivation. My PhD research at Cornell University had me spending my summers in a lot of commercial wineries' vineyards in the Finger Lakes Region of Upstate New York. It was stunningly beautiful, but the world of cranberries is completely different and so fascinating! Production is happening on a much larger scale, and I'm looking forward to the 2024 growing season and finally meeting the creatures I've heard like to live in the bogs.



POSITION

ORISE Postdoctoral Fellow in the USDA Genomic Improvement for Fruits and Vegetables Lab (GIFVL)

LOCATION

The Marucci Center in Chatsworth, New Jersey

ABOUT ME

I am DeafBlind due to a genetic condition called Usher Syndrome, and I was told to choose a career that suits my disabilities growing up. I didn't listen, and chose to be a trailblazer.

I think that having diverse people and perspectives in science, allows us to create more sustainable, holistic, and innovative solutions to the world's problems.

Also, I have a website at www.breannekisselstein.com in case you're interested in learning more about me or my research experiences!

Another thing I love is that cranberries have been extremely valuable to Indigenous people for a very long time. I am trying to find ways to connect to local tribes and find out what they learned about this intriguing and sour little fruit.

What are some challenges in your project?

I think the hardest part of this project so far is in developing new methods for perennial crops like Vaccinium species. So many of the world's greatest breeders have developed computational tools to allow us to analyze these large datasets more efficiently than ever, so that we can get the best possible cultivars out to you even faster to help us fight off heat stress and fruit rot in our bogs. However, these tools were all developed for annuals such as wheat, rice, or corn! While I simply just love a good challenge, I think the most exciting part about this is that once we develop and fine-tune these tools, our colleagues breeding other perennial crops can use them too.

What do you hope to do in the future after your work here?

It is my goal to be able to continue doing research in the plant sciences and address complicated issues like abiotic stress and opportunistic pathogens that are increasing due to climate change over the next couple decades. I also love teaching and mentoring the next generation of scientists, especially scientists from diverse backgrounds. It is my dream to return to my alma mater (RIT/NTID), a place built for transdisciplinary innovation and where Deaf and hearing worlds collide, to mentor the next generation of scientists in plant sciences and computational biology.

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"What is SAME?" by Leslie Holland, *University of Wisconsin-Madison*
"Researcher Spotlight" by Breanne Kisselstein, Postdoctoral Fellow, *USDA GIFVL/Rutgers University*

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Partners

Do you want to contribute to the SAME newsletter? If you are interested in contributing or have announcements for events, publications, or another initiative that you want to share, contact Josie Russo at jrusso2@wisc.edu with the subject line “SAME Newsletter Contribution”

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