

Sustainable Cranberry Production FY23

Status: APPROVED

Project Director

Hilary Sandler

Organization Project Number

Accession Number

7002085

Start & End Date

10/01/2020

Organization

University of Massachusetts

To Project / Program

"Sustainable Cranberry Production"

Primary Critical Issue

Sustainable Agriculture and Food Systems

Fiscal Year

2023

In 2-3 sentences, briefly describe the issue or problem that your project addresses.

We address new and emerging pest issues (e.g., vaccinium scale, cranberry black bug, green spanworm, false blossom vectored by blunt-nosed leafhopper, resistant cranberry weevil) by gathering data on occurrence in the industry and discovering details about the biology of these pests in the cranberry production systems. We develop use-pattern recommendations based on rigorous applied studies in the field and laboratory. We then disseminate this information to our stakeholder community (state, regional and national cranberry growers). In an iterative process, we assess our impact on growers' practices, develop research priorities to address current and future needs and design research to answer questions and obtain tools that help growers to manage problematic insects.

CO-PI Jerenyama: Our project addressed 1) the lack of clear fertilizer nitrogen recommendations for second-generation cranberry hybrids, 2) the effect of fertilizer nitrogen on cranberry canopy characteristics, and 3) the effect of fertilizer nitrogen on fruit rot development.

We hypothesized that although fertilizer nitrogen can increase cranberry fruit yield, in the process, it provides increased substrates for microbial biomass and activity, resulting in diverse microorganisms affecting fruit rot. In addition, external nitrogen may cause excessive cranberry canopy growth thereby providing a conducive environment of high relative humidity (RH) that encourages fruit rot fungi.

Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.

We provided diagnostic services and recommendations, so growers were able to apply the correct management option to the correct situation at the right time. We also continue to refine use patterns for insecticides to maximize control and minimize environmental impacts. We continue to promote IPM and interregional collaborations. We interviewed with multiple media outlets regarding the impact of climate change on cranberry production. All of these efforts are critical to all of our stakeholders as we continue to provide effective pest management tools to the cranberry industry, which enables growers to sustain their economic viability.

We educated growers on resistance management in terms of insecticide rotation when controlling pests as well as BMP's and use patterns for new compounds. We made 40 visits to growers' farms, microscopically analyzed over 60 vine samples for insect infestation and handled more than 100 calls/texts from growers. We updated our Scale and Black Bug fact sheets and created a new Blunt-nosed Leafhopper fact sheet.

CO-PI Jerenyama: We conducted an experiment involving four cranberry hybrids (Stevens, Crimson Queens, Demonranville, and Mullica Queens) and four fertilizer nitrogen rates (40, 60,80 and 100 lb/acre). We took biomass from each hybrid, berry yield and evaluated the incidence of fruit rot. Part of the fruit yield sample was used to determine total anthocyanin content, titratable acids, and total soluble solids. Fruit firmness and quality were also determined. In addition, we evaluated the temperature and relative humidity of the canopy.

Briefly describe how your target audience benefited from your project's activities.

Cranberry growers managed outbreak populations of Vaccinium Scale and we monitored for Cranberry Black Bug and Blunt-nosed Leafhopper.

Cranberry growers expanded their use of Fanfare (insecticide) to use against Cranberry Weevil, an insect that has shown resistance to 3 classes of insecticides and has a significant negative impact on cranberry yield.

Timely diagnostics and management guidelines were provided by Extension faculty and staff to cranberry growers. We continued to provide high-quality virtual and in-person educational programs for our stakeholders. Growers are able to obtain recertification credits to maintain their pesticide applicators licenses through attendance at these meetings. We maintained critical connectivity with our stakeholders and provided them with letters, reports, diagnoses, and management guidelines that were immediately and positively impactful on their farms.

CO-PI Jerenyama: Through Bogside meetings and other Extension meetings, cranberry growers and handlers were appraised on the effect of varied fertilizer nitrogen on fruit yield, quality, and rot. Growers have a better understanding of how much more fertilizer nitrogen they might need to optimize on their crop as they

Briefly describe how the broader public benefited from your project's activities.

Our activities support the Mission of the Cranberry Station, the Center for Agriculture, Food and the Environment and the Land Grant mission by maintaining and enhancing the economic viability of the Massachusetts Cranberry Industry through research and outreach and serving the public welfare by supporting economic development and the protection of the environment. The economic and environmental health of the cranberry industry has positive reverberations in the southeastern region of the Commonwealth and beyond.

Comments (optional)

Please Include any outputs, such as workshops or trainings, consultations, site visits, etc. Also enter any publication citations or other products here.

The Entomology program was greatly impacted by the disruption caused by the renovation of our laboratory facilities and the construction of a new building in 2022. We were able to “rebuild” our lab for 2023 and hold 3 hands-on insect clinics in our renovated lab and the new meeting room. Growers were able to view a number of insects through microscopes and new video microscopes. While attendance was low, it was remarkably well received.

We ran our own clinics in addition to participating in several bogside meetings. We included information including pictures in the newsletters and on the IPM messages. In addition, we had many one-on-one meetings with growers who brought in samples and questions.

Postdoctoral fellows were included in the project, providing a training opportunity. Outcomes of this project were presented to growers at bogside and extension meetings, and they became part of the best management practices in fertilizer management in cranberry.

A partial data set of this project was presented at the Vaccinium conference held virtually, and a proceeding of the talk was published in *Acta Horticulturae* (*Jeranyama, P., G. Mupambi, and C. Kennedy. 2023. Optimal nitrogen fertilizer rates for second-generation cranberry hybrids. Acta Hort. 1357:9-12*).

April, 2023. Newsletter. Preliminary Keeping Quality Forecast By Leela Uppala and Peter Jeranyama.

<https://ag.umass.edu/sites/ag.umass.edu/files/newsletters/14-2023-apr-cranberry.pdf>

June, 2023. Final Keeping Quality Forecast By Leela Uppala and Peter Jeranyama

<https://ag.umass.edu/sites/ag.umass.edu/files/newsletters/16-2023-jun-cranberry.pdf>

Chair (Leela Uppala) (1/19/2023 8/1/2024) of the American Phytopathological Society's Extension Committee 2022-2024 term.

Disease Diagnostic Services to Cranberry Growers: During the current report period, I visited 11 bogs for in situ diagnostics and also processed 31 samples in our cranberry diagnostic lab. Based on the diagnostic results, I provided timely management guidelines which helped growers manage Upright dieback and Phytophthora root rot diseases.