

Project Title: Sustainable Cranberry Production

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Project Overview

The cranberry industry in Massachusetts faces many challenges. Growers struggle to remain economically competitive and environmentally sustainable. It is anticipated that the industry may lose some acreage due to attrition and that smaller growers may sell their land. As with all farmers, energy costs are rising quickly, impacting the bottom line. Growers must develop and adopt innovative technology to remain competitive. The additional pressure of marketing fruit for export (foreign) markets that mandate restrictive thresholds for pesticide residues present yet another challenge. Growers must understand the biology of cranberry pests to properly utilize new management tactics. Additionally, they must contend with increasing urban pressure on the farm's margin as many parties compete for resources. The goal of the UMass Extension Sustainable Cranberry Project is to provide cranberry growers with pertinent and timely information so they may sustain their operations in Southeastern Massachusetts.

Situation & Priorities

The Cranberry Team works closely with a broad coalition that includes growers, consultants, professional associations, private vendors, non-profits, state and federal agencies, legislators, local officials and citizens. Extension staff, researchers, and partners consider options and focus efforts on the most critical needs and logical avenues. The Cranberry team convenes stakeholders to share information in a variety of formats that promote discussion and analysis of past, current and future issues in cranberry production and research.

The Cranberry Team will target the Parent Plan of Food Security and will also include Environmental Stewardship. We will plan projects to develop new techniques to control primary pests of cranberry including dodder, perennial weeds, fruit rot, and cranberry fruitworm. We will also undertake projects that will increase our knowledge base about nutrient inputs and water use in cranberry production agroecosystems. We will conduct IR-4 trials as needed to gather residue data that will be necessary to obtain EPA registration for new compounds for pest control in minor crops. We will pursue grant monies to support applied field research to gather efficacy and use pattern data for new and available compounds. We will continue our educational outreach efforts via newsletters, workshops, and electronic media to inform our constituent audience about the most current methods in managing pest populations in an integrated and environmentally sustainable way. In 2016, we plan to offer focused educational programs related to resistance management for insects, diseases, and weeds as well as educate growers on water conservation and efficient water use practices.

Stakeholder Input

The primary stakeholders are the MA cranberry growers, however, the general citizenry of MA is also included as well as cranberry growers from other regions in the United States and Canada. We work closely with grower organizations, such as the Cape Cod Cranberry Growers Association (CCCGA) and The Cranberry Institute for input concerning our applied research projects. The CCCGA Research Committee publishes Research Priorities each year and we align our applied projects with those priorities to obtain industry-related grant support. We also establish grower advisory panels as needed to provide input and guidance for particular grant programs (e.g., SARE, EPA, NE-IPM) as needed.

Evaluation Overview

We are fortunate to have a close working relationship with our constituents. This allows us to gauge implementation of specified indicators via personal conversations and small group workshops. The issuance of research priorities by the CCCGA also provides feedback as to whether we are providing appropriate information and data for the industry. We periodically conduct written and phone surveys to gauge grower adoption and implementation of management practices. Ocean Spray Cranberries, Inc. have been providing pesticide use data on a 2-year cycle (2005-2013) and this gives actual data by which we can evaluate changes in use patterns for cranberry pesticides.

Activity Summary - 2016

- Annual Meeting - Cranberry Management Update (1)
- Bogside Workshops (5)
- Cranberry Station Newsletter (6)
- Cranberry Station web site (1)
- Presentations, talks and workshop regarding the development of BMPs for maintaining and enhancing native pollinator habitat (9)
- Fact Sheet developed and distributed regarding the development of BMPs for maintaining and enhancing native pollinator habitat (1)
- Graduate Student Applied Research (7)
- Implementation of tile drainage for improved cranberry health and pest management (1)
- Used on-farm research and grower feedback to develop Best Management Practices (BMPs) for tile installation and use. Results were presented at 3 large grower meetings and 2 on-farm workshops reaching 300 cranberry growers, and were summarized for distribution in a 13-page fact sheet and BMP document.(1)
- Research in support of reduced-risk pesticide registration (1)
- Use of analytic hierarchy process (AHP) to determine grower preferences for integrated management of dodder, a serious weed pest in cranberry (1)
- Cranberry diagnostic and management recommendation services (160)

Total Educational contacts

	Youth Contacts	Adult Contacts
Direct Contacts	100	1568
Indirect Contacts (Print, Web, etc...)		645

Narrative Summary and Impact

2016 was a productive year for the Sustainable Cranberry Production team. We held a series of successful meetings that were well attended by our grower clientele. Specifically, 220 growers attended the Annual Management Update meeting (regular and make-up) as well as a separate meeting on pesticide safety (attended by 65 people). We published 6 issues of the Cranberry Station newsletter, which was distributed to 243 recipients; most are in Massachusetts, but 10 were national or international addresses.

The UMass Cranberry Web site tallied (Google Analytics) 9,112 users between October 1, 2015-September 30, 2016 (-23%). However, we had 35,096 page views, which was <1% decrease from last year; we had 26,553 unique page views (-2%) on the site (14,431 entrances onto the site; -18%) during that time. Visitors spent an average of 1:34 minutes on the site (same as last year). The top 5 visited pages were: How Cranberries Grow, IPM message alerts, Faculty/Staff page, Cranberry Chart Book, and Frost Tolerance reports. The top 5 longest average times spent on a page were for: Recipes (4:57), How cranberries grow (4:44), Nutrient Management for Cranberries (3:57), Cranberry Chart Book (3:01), and Best Management Practices (2:02). Most users (88%) were from the U.S. but visitors were also from Canada (4.5%), Poland (0.7%), and UK (0.7%), and several hundred people from India, Japan, and Germany. Most users accessed the site via desktop computers (64%) but 26% used mobile devices (+18%) and 9.5% used tablets.

During the past year, we continued our research work on the use and implementation of tile drains for improved water management on cranberry farms. We held education workshops and working groups on pollen identification and pollinator habitat. A 16-page pamphlet on bees was published in April. We had two IR4 projects in 2016. The impact of old and new chemistries on bee activity were also monitored. Our team supported the work of three graduate students. The full suite of our Extension publications and presentations are posted on ScholarWorks (see metrics below). Our diagnostic lab processed 60 samples in-house, 60 samples sent externally for virus testing, and made more than 40 grower site visits.

Project Summary-Impacts

Our 2016 meetings provided educational outreach to 337 attendees, and allowed 228 attendees to obtain 894 contact hours towards pesticide recertification. Based on survey data (N=120 respondents from 220 attendees) from our January 2016 Update Management meeting (full-day meeting), 55 and 64 (frost and irrigation use), 63 and 50 (dodder management/herbicide use), 79 and 35 (weed research update), 97 and

14 (nutrient plan), 79 and 36 (fruit rot management), 82 and 37 (insect management), 78 and 30 (bumble bee ecology), 79 and 32 (pollinator research), 45 and 54 (tile drain update), and 45 and 24 (grower panel on late water floods) growers got new information and/or got information they will likely use on their farm, respectively. The relevant topics for the responses are in parenthesis.

Web access continues to be an excellent resource for our constituents and people interested in sustainable cranberry production. Many of our fact sheets, presentations, and publications are available on Scholarworks, a digital repository. Based on the metrics generated by BeePress (which supports Scholarworks for UMass), visitors to the Scholarworks site downloaded 1,228 copies of various sections the UMass Cranberry Station Chart Books (+18% from last year), 302 copies of the Cranberry Production CP-08 (Executive Summary and Full) Manuals (-18% from last year), 638 copies of BMPs (-6% from last year; IPM was downloaded most frequently, 255 times), 2,635 copies of our Extension PowerPoint presentations (+22% from last year; jar test for mixing pesticides was the most popular with 250 downloads), and 772 fact sheets (+133% from last year; Sparganothis fruitworm was the most popular with 167 hits). We also had 1,092 downloads of various reports and surveys with the Reduced Risk Pesticide Use survey downloaded 953 times. UMass Cranberry Station documents were downloaded by people from 84 different countries. Interestingly, the largest increase of downloads came from China. We saw virtually no downloads from China in recent years, but in 2016 China ranked in the top 3 or 4 countries, usually behind Western Europe and Canada.

Collaborating Organizations

- **Cape Cod Cranberry Growers Association**
- **Cranberry Institute**
- **Ocean Spray Cranberries, Inc.**
- **Cranberry Research Foundation**