

Cranberry Station Newsletter February 15, 2018

UMass Cranberry Station
1 State Bog Road
P.O. Box 569
East Wareham, MA 02538
ag.umass.edu/cranberry
(508) 295-2212

Need Pesticide Credits?

All you need to know in 4 hours or less

UMass Pesticide Safety Training

Wednesday, April 25, 2018

8:00 AM – 12:00 PM

Rosebrook Event Center

TownePlace Suites Marriott

Wareham, MA 02571

\$55.00 per person: must be postmarked by 4/13/18

After 4/13/18 you are considered a “walk-in”: cost will be **\$75.00 per person**

You can now register and pay with a credit card online @ www.regonline.com/2018cranpst
or register with mail-in form on page 11

Tentative Agenda (4 contact hours)

- 7:30 Registration (with coffee)
- 8:00 WPS New Rules – Marty Sylvania
- 8:20 Herbicides for 2018 – Katie Ghantous
- 8:40 Insect Update – Marty Sylvania
- 9:00 Growing more for less – Marty Sylvania
- 9:20 Sprayer Calibration – Hilary Sandler
- 9:40 Fungus and Fruit Rot – Marty Sylvania
- COFFEE BREAK**
- 10:20 Frost and KQF – Peter Jeranyama
- 10:40 Resistance in Cranberry – Marty Sylvania and Katie Ghantous
- 11:00 Pesticide Safety Review – Marty Sylvania
- 11:20 Poverty Grass and Poison Ivy – Katie Ghantous
- 11:40 Zone II, Bees and BOGS Program – Marty Sylvania

Selected Highlights of the 2017 Cranberry IPM/Weed Program

Hilary Sandler and Katherine Ghantous

with support from
K. DeMoranville and N. DeMoranville

Weed management on new plantings. To evaluate the weed control provided by various combinations of preemergence applications of Devrinol and postemergence applications of Callisto in newly planted and 1-yr-old cranberry vines, six 2-yr experiments were conducted. At new planting sites, plots receiving treatments other than a single Devrinol application had less total weed biomass compared to nontreated plots. At second-year plantings, all herbicide-treated plots had less total weed biomass than nontreated plots; in addition, plots receiving Callisto-only treatments had less total weed biomass than Devrinol-only treatments. Herbicides did not adversely affect cranberry biomass production but overall vine colonization was poor for four of the six sites indicating that other factors, including cultivar choice, planting method, and water management, may play a larger role in rapid cranberry vine colonization than the suppression of initial weed biomass. Given the complementary range of efficacy for Devrinol and Callisto, a combination PRE-POST herbicide program of a low rate of Devrinol fb Callisto may be the most cost-beneficial program in many instances.

TAKE-HOME: If cost is a limiting factor, applying a single application of Callisto to a new planting should be included as a component of cranberry bed establishment since this practice consistently resulted in significantly less initial weed biomass compared to areas left nontreated (2017.31:599-608, *Weed Technology*).

Other highlights:

Obtained a Special Local Needs label (SLN or 24c) for chemigation applications of Intensity and Intensity One for control of grasses.

Perennial grasses are some of the most problematic weeds for cranberry growers. The grass-specific herbicide *Intensity* is effective, but is only labeled for ground-rig or aerial application making it difficult for growers to utilize. We demonstrated that it was safe to apply by irrigation, and were able to work with the company and the state to obtain permission for growers to apply by chemigation. This enabled growers to treat large areas successfully, and we have received positive feedback from growers regarding grass control results.

Screened five herbicides for use in cranberry.

Novel herbicides are needed to control problem weeds and allow growers access to more chemical mode of actions (MoA) to enable them to rotate chemicals and practice Resistance Management. Our program screened five herbicides registered for use in other food crops but not cranberry against perennial grasses and dodder in greenhouse trials and for crop safety in field trials.

Crop safety study with Kerb.

We anticipate Kerb 3.3SC will be registered for a use in cranberry (dodder as primary target) in 2019. We studied the effects of single and multiple applications of different rates to demonstrate crop safety and to help us formulate grower recommendations in the future when the herbicide is registered. This study also had a greenhouse component looking at the efficacy of Kerb against several perennial grass species.



Extension Highlights:

- In collaboration with Cornell University, we produced a slide presentation module that Extension personnel can use to educate growers about resistance management.
- We conducted an IR4 trial (M. Sylvia) with the herbicide, Chateau (active ingredient flumioxazin). This is a crucial step for registering new products for use in cranberry.
- Provided 2nd year of support (scouting, recommendations, etc.) for a new cranberry farmer who is transitioning his newly acquired bogs from conventional to organic.
- Completed year 2 of a 5-year study on the effects of registered herbicides on five newer large-fruited cranberry hybrid varieties.
- Worked with UMass Amherst drone pilot to photograph bogs with patches of off-type cranberry vines, and took fruit and vine samples from patches to help growers estimate impact on bog productivity.
- **Scholarworks** (digital repository). UMass Cranberry Station documents were downloaded by people from 129 different countries. China was a significant country for number of downloads, often #2.

Other Program Highlights:

- Published 1 journal article (Oecologia) and 5 abstracts (meeting presentations).
- Provided summer internship for one UMass-Amherst student and one industry intern.
- Editors for New England small fruit and vegetable guides (weed and herbicide sections)
- Conducted 6th (and final) year of treatments for studying the long-term effects of delayed applications of Casoron on four cranberry varieties.
- Administrated EIP grant program for UMass Extension small fruit, tree fruit, vegetable, and cranberry teams. Year 3 (of 3-year grant) monies from USDA-NIFA: \$194,000.
- Obtained industry support for applied research in weed management. CI/CRF/OSC: \$38,854.

- **ScholarWorks metrics**

Cranberry Chart book: 992 copies
(-19% from last year)

Cranberry Production CP-08 Manuals: 279
copies (-8% from last year)

BMPs: 673 copies (+6% from last year; IPM
was downloaded most frequently with 189)

Fact sheets: 676 copies (-12% from last
year; Physiology of cranberry yield, 151
downloads).

- **UMass Cranberry Web Site metrics**

9,086 users (same as 2016)
24,424 page views (same as 2016)
1:27 minutes spent on site per visit

Top 5:

How Cranberries Grow
Faculty/Staff page
IPM Message Alerts
Cranberry Chart Book
Frost Tolerance Reports

CRANBERRY ENTOMOLOGY PROGRAM 2017

**Anne L. Averill, Martha M. Sylvia
and Noel Hahn**

Averill has been on sabbatical, so the funding, personnel, and lab activities are limited this year

FALSE BLOSSOM OUTBREAK

This has the potential to be a severe new problem. A 70-acre site in Halifax had significant areas of False Blossom, a disease caused by a phytoplasma that is moved from plant to plant via the sap-feeding activity of an insect, the blunt-nosed leafhopper. We were shocked by the intensity level of false blossom on the relatively new hybrid vine (7 years old) planted at this site. This disease crashed NJ acreage and threatened MA cranberry in the early 1900s. Surprisingly, no blunt-nosed leafhoppers were detected on the Halifax acreage where the false blossom was observed in 2017. Several other sites did report sharp-nosed leafhopper, however. We will carry out surveillance and commodity education regarding the disease in 2018.

CRANBERRY SCALE OUTBREAK



This is a severe and very challenging new problem. For a fourth year, we diagnosed Putnam scale (*Diaspidiotus ancyclus*) as the causal agent for many die-off areas across the industry. Scales are sap-sucking pests that attach themselves to the plant. More than a dozen sites reported dead vines where heavy infestations of the cryptic insect had built up unnoticed. We examined

vines microscopically in late May and early June to determine scale presence and effective management windows. Several companies (or growers) had multiple sites and six additional sites had outbreaks in late summer, representing a late-season infestation that was too late to manage this year. One site had three different species of scale present. One Dearness scale (*Rhizaspidotus dearnessi*) site continued despite 2 years management. We will continue surveillance and commodity education regarding infestations in 2018.

COMPENDIUM FOR CRANBERRY RESEARCHERS AND PROFESSIONALS:

Polashock, J.J., F.L. Caruso, A.L. Averill, and A.C. Schilder. 2017. *Compendium of Blueberry, Cranberry, and Lingonberry Diseases and Pests*, 2nd ed. APS Press, St. Paul, MN. 231 pp

For this volume, Averill was responsible for the insect portion, recruiting authors from throughout North American and then editing 40 sections by 15 authors, which included 80 images. She authored six sections. For both researchers and growers, this is the current reference volume for cultivation of the genus *Vaccinium*.

SURVEY OF BEE DIVERSITY AND ABUNDANCE IN CRANBERRY

Refereed publication: Averill, A.L., M.M. Sylvia, N. Hahn, and A.V. Couto. Bees (Hymenoptera: Apoidea) foraging on Massachusetts cranberry. *Northeastern Naturalist* (in press)

In an extensive study, we have just completed and published the tally of bees foraging on cranberry flowers at 49 cranberry sites during eight bloom periods

between 2007-2016. We documented six families, 20 genera, and 72 species of bees. However, the collection was dominated (>90%) by bumble bees. We believe the upland areas surrounding cultivated cranberry beds and cranberry itself may be inhospitable for many small-bodied bee populations with limited flight ranges. Our results are significant: comparison with observations in the first half of the 20th century, together with collections made during a less intensive survey 25 years ago, suggest that two bumble bee species are increasing in abundance, but that at least half of the bumble bee species previously observed in this region have become very rare or locally extinct.

In a separate study, eleven bogs that had been surveyed in 1990-91, 2007-09, and 2016 were revisited and assessed for pollinator activity, allowing a quarter-century assessment of pollinator diversity and abundance over time at the same sites. Counts of activity and bee collections were made; analysis of the large data set with UMASS statisticians is ongoing by UMASS Commonwealth Honors Student Emily Brown.

POLLINATOR CONSERVATION AND BIOLOGY

Refereed publication: Suni, S., Z. Scott, A.L. Averill, and A. Whiteley. 2017. Population genetics of wild and managed pollinators: implications for crop pollination and the genetic integrity of wild bees. *Conservation Genetics* 18(3): 667-677.

Refereed publication: Dibble, A., A.L. Averill, K. Bickerman-Marten, K., S. Bosworth, Bushmann, S., F.A. Drummond et al. 2017. Bees and their habitats in four

New England states. *Maine Agric. Forestry Exp. Station (MAFES)* (in press)

We continued work on the State Bog Pollinator Garden for demonstration purposes. Signage, labelling and mapping for easier ID were carried out as well as maintenance and new plantings.

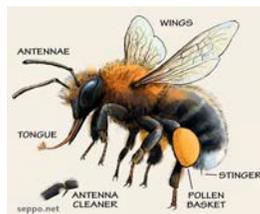
NATIVE BEE HEALTH: FOCUS ON PATHOGENS

Refereed publications underway: Xu, G., E. Palmer-Young, A.L. Averill, and S.M. Rich. Draft genomes of six trypanosomatid strains isolated from hymenopteran pollinators. *Genome Announcements* (submitted). Xu, G., E. Palmer-Young, K. Skyrn, T. Daly, M. Sylvia, A.L. Averill, and S.M. Rich. Triplex realtime PCR for detection of *Crithidia mellifica* and *Lotmaria passim* in honey bees. *J. Invertebrate Pathology* (submitted)

A.C. Couto, N. Hahn, and A.L. Averill. Regional and temporal parasite loads in bumble bees (*Bombus* spp.) associated with cranberry landscapes. *J. Invertebrate Pathology* (in preparation)

Averill, A.L. Disease associations among honey bees and wild bees in agricultural systems. *Scientific Reports* (in preparation)

WHAT FLOWERS ARE BEES UTILIZING?



ANALYSIS OF POLLEN LOADS

Pollen loads collected over two years from queens of five bumble bee species as well as four other species of common wild bees were processed by acetolysis and analyzed under light microscopy. We are tallying the data.

REGULATORY PROGRAM FUNDING: IR-4

A flumioxazin residue trial was completed this year by Hilary Sandler and Marty Sylvia. This herbicide is an option for management of moss, grasses and dodder.

Plant Physiology Research Agenda 2017

Peter Jeranyama and Rebecca Brennan

Irrigation water management. Irrigation scheduling continues to be a major challenge in cranberry production. Many growers tend to rely on the 1 inch per week “rule” from rain and irrigation despite evidence that in most years this results in some weeks with inadequate water and others with excess. It is highly likely that irrigation based on detecting available moisture in the soil and irrigating only when the moisture is inadequate to support plant growth results in better cranberry yield and less fruit rot. Values of soil water tension between -4.5 to -6 kPa seem to be adequate. The results showed that the grower practice had tension readings of -2 kPa or less and consistently wetter than the tensiometer method. Fruit rot was 7% higher and yield was 24% lower under the grower practice relative to the tensiometer method.

Irrigation cycling in cranberry frost

protection: The objectives of this project are to (i) determine the effective set points for automated frost cycling by evaluating several options selected from grower experience, and (ii) quantify the amount of water applied and fuel used during the evaluated cycling protocols for both mild

and severe frost events and compare to water use in a non-cycled protocol. Comparison of fruit yield and water use supports the hypothesis that cycled frost irrigation provides adequate (and in some cases, better) frost protection of cranberries and management of water resources. Water savings under cycled frost irrigation ranged from 33-80% compared to conventional frost irrigation. Generally, bud damage was relatively low for both frost irrigation methods: mean = 4% of damage occurred in 1-2 floral initials.

Sun scald Research. High summer temperatures (> 95°F) could potentially cause physiological stresses on cranberry vines. If these high temperatures occur during fruit set, sun scalding could result and further weaken the immunity of the fruit/vines so that they become more susceptible to fruit rot. Plants in general have a cooling mechanism of hydrating themselves through a process called transpiration. Could it be possible that the transpiration process is inadequate to cool the berries? If so, can in-day brief irrigation sprinkling be a solution. This project seeks to compare a pre-dawn irrigation event in anticipation of a hot summer day versus in-day brief sprinkling of the vines to avoid sun scald on developing fruit. Plants can cope with heat stress much like we do; they avoid it or they tolerate it. Avoidance involves maintaining hydration and internal temperature as water is moved from the soil, through the roots and shoots and out through pores (stomata) in the leaves.

Refereed Journals

- Faith Olszowski, Peter Jeranyama, Casey Kennedy and Carolyn DeMoranville. 2017. Automated cycled sprinkler irrigation for spring frost protection of cranberries. *Agricultural Water Management* 189:19-26.
- Jeranyama, Peter, Jenna Sicuranza, Harvey J.M. Hou and Carolyn DeMoranville. 2017. Shade effects on chlorophyll, gas exchange and nutrient content of cranberry vines exhibiting yellow vine syndrome. *Journal of Applied Horticulture* 19(1):3-7.
- Kennedy, C.D., P. Jeranyama and N. Alverson. 2017. Agricultural water requirement for commercial production of cranberries. *Canadian Journal of Soil Science* 97:38-45.
- Jeranyama, P., C. DeMoranville and C. Kennedy. 2017. Evaluating tensiometers and moisture sensors for cranberry irrigation. *Acta Horticulturae (ISHS)* 1180:369-372.
- Jeranyama, P., and J. Sack. 2017. Temperature and photon flux density effects on carbon assimilation in cranberry. *Acta Horticulturae (ISHS)* 1180:485-489.
- Kennedy C., P. Jeranyama and C. DeMoranville. 2017. Causes and effects of poor drainage in cranberry farms. *Acta Horticulturae (ISHS)* 1180:445-452.

USDA-Agricultural Research Service (ARS) Hydrology Lab 2017

Casey Kennedy, USDA Research

Hydrologist

Sophie Wilderotter, USDA Technician

Brain Lieb, UMass Technician

Nicole Henderson, UMass Technician

About our group

Our research program focuses on developing water and nutrient management strategies that enhance water quality in southeastern Massachusetts. Our program combines basic and applied research to improve water use efficiency and reduce nutrient runoff in cranberry production. We conduct lab and field studies to understand processes that link agriculture to water resources and to develop appropriate remedial measures.

Reducing phosphorus in surface water used for cranberry production

In 2017, our research group developed a simple, cost-effective method for reducing phosphorus in irrigation water. The method consisted of applying an aluminum-based

salt ("alum") directly to two irrigation ponds. We worked with a local grower, who operated a custom-built sand barge that was used to apply alum. Results showed that alum application reduced phosphorus levels in irrigation water by 78-95%. With further testing, it may be possible to use alum to reduce phosphorus in harvest floodwater. The research was published in *Journal of Environmental Quality*, and was also the subject of a non-scientific article published online: (<https://www.certifiedcropadviser.org/science-news/cranberry-growers-tart-phosphorus>).

Distribution of nitrogen and phosphorus in cranberry soils

A large focus of our research was motivated by a single question: What is the thickness of peat in cranberry bogs? Fortunately, local NRCS soil scientists had been studying the same question since the 1990s. We partnered with NRCS to develop a model of mean peat thickness that was applied to 505 cranberry bogs in Massachusetts. Our model indicated that an average cranberry bog consists of 3 ft of peat, which is capped by roughly 1.5 ft of sand. Notably, peat is absent in about one-fourth of bogs, which

reflect modified upland or glacial lakebed soils rather than peat. Based on available soil chemical data, we estimate that peat contains 87% of nitrogen stored in bogs, whereas only 20% of phosphorus is stored

in peat. These results indicate that, especially for bogs that receive upwelling groundwater, decreases in nitrogen fertilizer application rates may not reduce nitrogen runoff from bogs.

Publications

Kennedy, C.D., P.J.A. Kleinman, C.J. DeMoranville, K.R. Elkin, R.B. Bryant. 2017. Managing surface water inputs to reduce phosphorus loss from cranberry farms, *Journal of Environmental Quality*. doi:10.2134/jeq2017.04.0134

Kennedy, C.D., N. Alverson, P. Jeranyama, C. DeMoranville, Water and nutrient balances of an agricultural peatland, in review, *Hydrological Processes*

Kennedy, C.D., S. Wilderotter, M. Payne, A.R. Buda, P.J.A. Kleinman, and R.B. Bryant, A geospatial model to quantify mean thickness of peat in cranberry bogs, in review, *Geoderma*.

Kennedy, C.D., P.J.A. Kleinman, A.R. Buda, R.B. Bryant, Distribution of nitrogen and phosphorus in soils cultivated for cranberry production, in review, *Soil Science Society of America Journal*.

Progressive Grower is sponsoring:

OSHA RESPIRATOR TRAINING & FIT TESTING

Thursday, February 22, 2018

8:00 AM

Rosebrook Event Center, TownePlace Suites Marriott

Wareham, MA

Cost: \$95

Seats are limited!

Please call: 508-273-7358

Class is approximately 4 hours long.

Please bring your respirator.

New respirators will be available on site for purchase.

2018-2020 UMASS CRANBERRY CHART BOOK

The Cranberry Station is now taking orders for the 2018-2020 Chart Book. **Please note this is the first release of a multi-year edition.**

≈ As always, the Chart Book is **free** and will be available for pick up at the Station in early April

≈ **\$6 mailing fee (per book)** if you want your copy mailed to you

≈ Please see order form on page 11

Here at the Station:

DONATE/SELL? We are in need of a 4-inch pump.
Do you have one you are willing to donate or sell?

DO YOU NEED? We have about 2 tons of iron shavings/chips.
We are entertaining offers!

Please contact: **Rick Leibe 413-230-1865**



Hilary Sandler
Director, Cranberry Station

UMASS CRANBERRY STATION WORKER PROTECTION STANDARD HANDLER TRAININGS

Worker Protection Training using the new materials from the EPA for cranberry workers in the handler category for Spring 2018 will be held:

CRANBERRY STATION LIBRARY

2:00-4:00 PM

on the following Wednesdays:

March 28th

April 25th

May 30th

June 27th

There is a \$10 fee to cover the cost of the WPS training manual. If you have a pesticide license, you do not need this training. If you have workers, they do need this training!

Contact **Marty Sylvia: 508-295-2212, ext. 20** to sign up or for additional information!

UMASS PESTICIDE SAFETY TRAINING REGISTRATION FORM

Wednesday, April 25, 2018
7:30 AM – 12:00 PM
Rosebrook Event Center
TownePlace Suites Marriot
Wareham, MA

\$55.00 per person
Must be postmarked by 4/13/18
After 4/13/18 you are considered a "walk-in":
cost will be \$75.00 per person
Please contact the Station to be added to the list.

You now can register with a credit card online at:
www.regonline.com/2018crampst

or
Please make checks payable to **UMass** and return
registration form along with payment to:

UMass Cranberry Station
PO Box 569
East Wareham, MA 02538

Don't forget your Photo ID and Pesticide Number

PLEASE PRINT

ALL Pesticide Safety Training (4/25/18) attendees **MUST** register and pay (whether receiving credits or not)

Name: _____

ADDITIONAL ATTENDEES:

COMPANY: _____

EMAIL: _____

PHONE: _____

2018-2020 UMass Cranberry Chart Book Order Form

You will be able to pick up your **FREE** copy of the Chart Book at the Station in early April. Please include your email address so we can let you know when it is available. * **Please note this is the first release of a multi-year edition.**

If you would like your copy mailed to you, there is a **\$6 mailing fee (per book)**. Please include a check payable to **UMass** and return to: UMass Cranberry Station, PO Box 569, East Wareham, MA 02538.

NAME: _____

COMPANY: _____

ADDRESS: _____

TOWN, STATE and ZIP: _____

PHONE: _____

EMAIL: _____

PICK UP AT STATION _____ OR POSTAL DELIVERY _____



**CRANBERRY STATION
NEWSLETTER**

Inside this issue:

- **2017 Research Highlights**
- **Pesticide Safety signup**
 - ◆ \$55.00 postmarked by 4/13/18
- **Chart Book order form**
- **Station updates**

UMASS EXTENSION
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