



Cranberry Station Newsletter

DECEMBER 16, 2015

UMass Cranberry Station
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Record Crops, Fruit Quality in the 'Year Without Bravo', and a Hot Dry Summer - Notes from the Thirteenth Annual Crop Summit

On December 7th a group of 39 growers, researchers, handler reps, and association staff gathered in the Station library to discuss the 2015 season. The issues were much the same as discussed in 2014: winter moth and scale insects (along with the usual suspects); fruit rot, scald and fruit splitting; irrigation management and in-day cooling; poverty grass and dodder; and nutrient management.

Overall crop volume and quality

Many in attendance had big crops in 2015. The A.D. Makepeace Company reported a record crop with a 13% increase over 2014. Ocean Spray growers in MA delivered 8% more fruit than in 2014 and the Cranberry Marketing Committee (CMC) noted that the MA crop came in at 2.3 million barrels, well above their August estimate. CMC also noted that WI crops were down and that overall the US crop is below previous estimates, reducing the anticipated carryover from 85% to 77-78%. Quebec is also reported to have harvested 500,000-600,000 fewer barrels than in 2014.

David Nolte of Ocean Spray shared Joe DeVerna's 2015 data for their MA growers. Here it is added as the last column of a table of average bbl/A production data previously shared by Joe.

Massachusetts	2009	2010	2011	2012	2013	2014	2015
All cultivars	142	146	193	177	161	174	192
Early Black	126	130	171	144	138	135	156
Howes	117	129	168	148	132	133	141
Stevens	197	209	233	245	205	216	248
Ben Lear	202	225	281	255	232	237	267
Other cultivars	95	121	164	152	171	247	
Mullica Queen							348
Demoranville							288
Crimson Queen							269

This year, there were enough Rutgers variety beds in full production to split out their average yields; in previous years they were lumped into 'other cultivars'. Ocean Spray collects these data for all of the US growing regions. When comparing across regions *within* a cultivar, MA crops are similar to those in WI and NJ on a per acre basis. MA has a lower total average compared to other regions due to the many acres of Early Black and Howes compared to other regions that have fewer natives left in the ground.

Quality attributes. Ocean Spray reported that percent poor rose 1% compared to 2014 and that color was substantially less than last year but similar to the 5-year average. The 1% decline in quality vs. 2014 was similar among cultivars. Several growers noted that their % poor was up, but some attributed that to their large crops and still came out ahead with the larger yield. This led to some philosophical discussion about whether a large crop is inherently associated with poorer quality. Fruit quality also formed a large part of the discussion of diseases/fruit rot (see below).

Weather

Surprisingly the 2014-2015 winter was not a hot topic. I think we all just wanted to forget it! Some thought the deep snow pack was a positive but others noted that sanding just prior to the big snows was not very successful, the sand didn't filter in well and crops suffered in some cases as a result. Beds that were sanded earlier in January did better. One grower noted the effect of the melt of the snow pack on water tables in the spring. High water tables coming into the season helped to mitigate the lack of rain in the spring and summer.

June and July were about normal for temperature but August and September were well above the norm. While there were no 90° days in August, there were 17 days with a maximum temperature greater than 85°! One grower noted the poor sizing on native cultivars. This may be why -- cranberry fruit gain mass at the greatest rate when maximum temperature is between 68° and 85° so many days in August did not favor rapid weight gain in the fruit. September continued to be warm with 13 days having maximum temperature above 80°; this likely contributed to poor color on the fruit. July through September were also well below average for rainfall.

Other potential impacts of weather on fruit quality were also discussed. It was noted that no classic scald conditions (hot, dry, windy) were recorded this summer but that the hot dry days in late August may have contributed to fruit splitting as water status in the fruit may have varied among days when irrigation was applied and the days between irrigations. This splitting phenomenon was observed not just in the newer cultivars, but on Stevens, Ben Lear, and even natives. While not always extensive, splitting did seem to be more prevalent in 2015 than in prior years. We speculated about the possibility that this would be similar to what happens in tomatoes when soil moisture is even for a period of time and then there is a big rainfall. In that crop, the fruit are prone to splitting as the plant takes up more water from the moister soil. The idea of applying lower irrigation volumes each day rather than a larger volume every three days was discussed as a possible way to prevent cranberry splitting when the weather is hot and dry. Carolyn mentioned visiting a farm in Oregon in August where the grower had automated irrigation linked to a tensiometer and programmed to a narrow range of soil moisture. At that site, the irrigation was triggered most days for less than an hour. It is noteworthy that, at the 2014 summit, Peter Oudemans reported that high temperatures in late August in New Jersey were associated with a rapid decline in fruit quality, including splitting.

The final weather question was in regards to the current warm fall and whether it is a problem. We started out near normal in October but November and December have been warm. We have been accumulating chilling hours (hours below 45°) and there have been many cool nights to promote hardiness in the plants. As long as the temperatures continue to gradually decline, there should be no issues. A concern would be a sudden deep freeze that might 'shock' the plants into loss of hardiness.

Weeds - Herbicides

Dodder, poverty grass, and the newly emerging problem, deer-tongued panic grass were the primary species discussed this year.

Poverty Grass (PG). Select Max applied after fruit set was reported to give good control -- one grower reported great success at 16 oz/A applied aerially. Earlier applications of Select Max seemed less effective and several reported observing fused-petal flowers if they applied the material early when flower pods were present, and sometimes even before. From a distance bogs with this symptom seem to have fewer flowers but closer observation shows that flowers are present but deformed by petal fusing.

The best outcomes with Select (or similar materials) are achieved when applied very early (well before hook) for early grass management and post fruit set once berries are sizing for grass species that occur later in the season. Select Max was reported to also work well on the emerging problem, deer-tongued panic grass. It was noted that the grass was killed but that what was left was a large amount of dried, brittle biomass. Quinstar and Callisto were also reported effective when used as part of the herbicide program.

Growers reported struggling with the large increase in PG in off-bog surroundings serving as a continuing source of infestation.

Dodder. Most of the discussion about dodder revolved around getting effective control with Casoron. Some of the successful scenarios: 40 lb/A applied by air in the second week of May gave uniformly good outcome; 70 lb/A applied in the first week of May gave better control than in 2014 but still with some bad areas; 60 lb/A worked really well on Howes (compared to less success in the past with 40 lb/A) to the extent that the crop more than doubled.

Callisto at 8 oz/A in a spot treatment was reported effective against dodder by one grower. A grower from the Cape who previously struggled with this weed had little dodder in 2015 as did some of his neighbors. There was speculation that this might relate to natural fungal infections of dodder in the absence of Bravo fungicide use. But, only in the absence of all fungicides would there likely to be enough infection of the dodder to make a difference. However, Quinstar had been used successively for 2 years, two years previously. The herbicide is reported to be most effective in years following an application or when used for multiple years.

One grower had dodder at a site where it previously had not been an issue and noted that the only change at that site was the high water table subsequent to the big snow melt.

It was also noted that dry picking with Furford pickers spreads dodder seeds around.

Other items. Moss -- what works? Hilary Sandler and Katie Ghantous discussed the use of iron sulfate, the only registered material that has been effective. In the western growing regions, growers have applied this via chemigation. Katie tried a simulated chemigation of iron sulfate in 2015 with good success. The material is difficult to dissolve for chemigation and systems must be well rinsed to prevent damage to the pipes but this is being used elsewhere and seems to work in MA. We will likely try an actual chemigation on State Bog in 2016.

Callisto -- It was noted that, after application, weeds 'flash' (whiten) dramatically but then seem to recover. However, the consensus was that over a period of years using this material, susceptible weed populations contract or stay the same size, so the herbicide is providing management even if there is not an outright kill. Many agreed that application by sprayer appears more effective than chemigation applications. Rotating with Quinstar could help. This

is a good herbicide with a different mode of action, but does not hit the same spectrum of weeds as Callisto and is not a true replacement for Callisto. Quinstar is legal to use and is approved by all handlers for use on domestic market fruit. MRL harmonization is still a barrier to use on fruit for the export market, although that issue appears to be nearing resolution.

The new recipe for using a concentrated Callisto solution for poison ivy spot treatments seems to be working well. Katie noted that you need to wait long enough before the second application so that the poison ivy is starting to recover and produces new leaves before you do a second treatment, about 3 weeks after the first. This makes the weed use resources to regrow that are then not available for recovering after the second application, and also ensures there is enough leaf area for good herbicide contact in that application. The label *requires* a minimum of 14 days between applications. Hilary reported that good efficacy has been seen for several weed species when applications were made 3-4 weeks apart.

Hilary reminded everybody that if you are planning to use a fall herbicide, application should be timed to allow at least 3 weeks before the winter flood.

Insects - insecticides

Winter moth. The moths are flying now in substantial numbers, similar to the 2014 flight that led to high larval infestations in the spring of 2015. Marty Sylvia reminded everybody that if you do not scout until mid-May, you will miss this insect and could suffer substantial damage. The larvae bore into and destroy the terminal bud so that by later in the spring, damaged areas present as an arrested terminal bud with a side shoot, similar to frost damage. Such damaged uprights will not flower. In fact, the first cranberry site ever diagnosed with winter moth damage was initially thought to be frost damage. Marty and Carolyn visited two crop insurance sites, found areas with almost no fruit and diagnosed the problem as unchecked winter moth infestation.

If you have a heavy flight in the fall and a history of problems with this pest, an early season prophylactic spray is recommended by Anne Averill. Many of the growers present reported doing so in 2015 to good effect but had problems on sites where they did not spray. Delegate and Avaunt are effective but if you have weevil problems you may want to save the Avaunt for use against that pest. There is a biocontrol agent (fly) that has been introduced into the area by Joe Elkinton of UMass to combat winter moth but with the high populations we have seen, it is hard to eliminate the problem by relying solely on biocontrol.

Gypsy moth. Populations were huge in 2015, but this insect tends to boom and bust, so it is possible that infestations maybe less in 2016. Some gypsy moths overwinter as eggs on the bog, originating from larvae that had completed development there and emerged as flightless females the prior year. These eggs then hatch on the bog. Growers noted that this year it was common that additional larvae can also blow in from the trees -- one grower reported counts of more than 100 a few days after spraying due to subsequent windy conditions. Sevin was as effective as Delegate against gypsy moth when applied early (small larvae). Once you stop seeing larvae in sweep nets, you often can 'catch' large ones by leaving a board out overnight; the large larvae will be on the underside in the morning. However, once they reach this size, they are almost impossible to kill with pesticides.

Cranberry weevil. This insect was around early on many bogs but many growers reported having had less of a summer problem. As with Sparganothis, targeting the spring generation is very important in managing this pest.

Scale. This year was as bad as 2014. Marty and Anne made more than 20 site visits where scale was suspected. Interestingly, about 25% did not have scale. Of the remainder, 11 were Putnam scale, not historically reported on cranberry. However, an insect historically reported as 'cranberry scale' may have been misidentified as Putnam scale. Diazinon is effective against scale but since its use is not allowed during bloom, the recommendation is to spray just before bloom (mid-June). Growers who followed this protocol had good control of scale. Applying Diazinon post-bloom, when it is again allowed, does not give effective control of scale.

Cranberry fruitworm. Anne highly recommends using Altacor for the first two applications against cranberry fruitworm. These sprays should also manage Sparganothis if they are timed just as the insects hatch. The interval between the two Altacor applications can effectively be stretched to 10-12 days. This may result in no need for a third spray (based on egg counts). With this interval, any subsequent sprays should be post bloom, allowing for the use of Delegate without risk to bees. Altacor requires an efficient, well timed, fast rinse-out chemigation system to be effective. If yours is not, consider upgrading. We have used the two Altacor regimen at State Bog and Rocky Pond for several years with excellent results.

Some growers reported good luck managing cranberry fruitworm at most sites but about 1 in 10 sites had persistent eggs requiring numerous sprays. Possible causes: poor chemigation system, mix of cultivars, protracted bloom, and high fruitworm pressure at those sites. However, the implementation of Altacor has been associated with reduced fruitworm pressure at many sites.

The question was asked: Can resistance to Altacor develop with this regimen of two sequential applications yearly? Anne felt that this was unlikely for cranberry fruitworm due to its life cycle and behavior but that this would be a real possibility for Sparganothis. Intrepid and Delegate do work on Sparganothis and can be used to manage the spring population of that insect. However, there is consensus that Delegate is being overworked and that resistance to that may result.

Insecticides. Lorsban may be cancelled based on a current proposal from EPA. New compounds are hard to come by and some are being blocked or withdrawn due to EPA classifying cranberry as an aquatic crop and requiring additional aquatic studies that the registrants are not interested in taking on. For this reason, the Belay label for cranberry is being withdrawn by Valent. This was a good material against flea beetle, an insect that occurs well after bloom. Work should be done to educate EPA that cranberry is not grown in an aquatic system. John Wilson shared that this will be a priority for the Cranberry Institute over the next 6-12 months and that CCCGA will also play a role in getting that message to the right people.

Bees. Bumble bees were strong in 2015 and there were no reported problems with migratory honeybees. Anne reported that her research has shown that bumble bees on managed cranberry lands did better than those at conservation sites.

Do not use neonicotinoids unless you absolutely have to and then only use these materials post bloom. This class of chemicals has been highly politicized as the cause of honeybee decline and there are groups collecting and testing pollen to support that contention.

An example of post-bloom use would be using Admire (imidacloprid) for grubs. Do not use Actara for spring weevil. It is a neonicotinoid that moves into nectar and pollen and hurts the bees. For weevil resistance management, it is best to rotate using Avaunt in the spring.

Diseases

Erika Saalau Rojas requests that growers review and comment on the disease priorities developed by the fruit rot working group and published in the November newsletter.

Fruit rot in The Year without Bravo. Many if not most of the attendees reportedly had no major rot problems. Some growers reported rotted berries underneath (deeper in the canopy) but two of those noted that their vine canopy was very thick.

The Keeping Quality Forecast (KQF) for 2015 was good for the first time in the last few years. However, Erika noted that fruit rot was around -- she saw substantial rot of 30-40% and as high as 80% in untreated areas in her fungicide trial plots. She reported good rot management in the treated areas when Mancozeb, ManKocide, Indar/Abound, or Proline were applied starting at 25% bloom in 7-10 day intervals. Oso, a newer product, worked well if used in combination with other materials (rotation) but not alone and only at full rate.

Without Bravo, the Mancozebs are all that is left for broad-spectrum material to use in resistance management. But many were hesitant to use them due to reported impact on color. Ocean Spray data shared at the meeting showed that while color was down from 2014, it was similar to their 5-year average. Color was delayed in 2015 but this may be more due to warm weather well into fall (especially the warm nights) than Mancozebs. Erika saw no color difference with or without Mancozebs on Early Black. On Stevens using Mancozebs as the early, mid or late application she saw no observable differences but noted that these plots were harvested early and all had poor color.

Some growers reported 'poppers', fruit with poor, yellowish color, especially on bogs with heavy Stevens crops. The question is: were these poorly colored berries popping from frost damage? This may be possible. In a heavy crop situation, there may be some berries that lose in the competition for a finite amount of carbon resources produced by the plant. Carbon resource deficit could affect any part of the plant's structure or physiology that depends on carbon compounds - just about everything! Anthocyanin pigments are carbon compounds, structural elements like lignin and pectin are as well and so are the compounds that confer frost hardiness.

Another question was in regards to fruit speckling (especially in Howes). Most have seen this from time to time, but it is not likely associated with fungicide use.

Fungicides. Erika asked the question - Did you use more fungicide to make up for not having Bravo? A few said yes, but most indicated that they used about the same amount as in other years. Most indicated that they would use Bravo in 2016 but a few indicated that they would not and had started to move away from it prior to 2015. The price of Bravo, which was previously similar to Mancozeb materials, is likely to rise in 2016 due to worldwide demand. An estimated cost of \$200-250 per acre for fungicides in 2015 was put forward by one grower and there seemed to be general agreement with that estimate.

Fruit quality? One grower reported his fruit quality as 'exceptional' and added that he did a full fungicide routine but no applications after July. He also implemented the use of tensiometers for irrigation scheduling and credited that for his success.

In determining the ultimate quality of the fruit, many factors are in play: changing irrigation by implementing tensiometers, use of daytime cooling to prevent scald damage based on discussions over the past few years, very close attention to fungicides in the absence of Bravo with some using additional applications. This makes it hard to isolate what factor(s) account for any change in quality. Also, the KQF was good this year.

Erika noted: "It's not just about the fungicides. Cultural practices, air circulation, irrigation practices - they all play a role". With or without Bravo, we will have to focus on cultural practices and research priorities that reduce fungicide reliance and improve fruit rot management. In the future we may have scald models or disease forecasting systems that may help prevent rot and maintain fruit quality.

Erika also raised the concern of trying to set a single temperature threshold for irrigation and scald prevention. Many factors like cultivar, fruit size, canopy density, and site location may determine which temperature should be used to trigger irrigation for cooling. Another consideration should be the possibility of creating a hot, wet microclimate for fungal infection when wetting the vines this way.

Irrigation

Irrigating for cooling or prevention of scald. Several growers reported using in-day cooling with varying protocols - these were mentioned:

- Automated triggered at 95° sheltered temperature and turning off at 80°, resulting in 1 or 2 rounds of 15-30 minutes
- Triggered a short in-day irrigation when sheltered temperature reached 100°, and 2 hours of 'regular' irrigation early in the morning if high temperatures were forecast
- Triggered at 102° unsheltered, usually resulting in about 20 minutes in the early afternoon.

A concern was raised about overheating pumps under automation if they ran for more than 20 minutes in the heat of the day. Many took the approach of preparing for hot weather mainly by irrigating in the early morning. However, one grower reported irrigating in the evening to prevent puddles once the sun was on the vines (water had time to infiltrate overnight). This discussion included the idea of more 'regular' irrigation (for example, daily) to avoid splitting by maintaining a more even soil moisture as discussed in the weather section.

Peter Jeranyama pointed out that there is no need for irrigation to cool the *vines* - they cool themselves with transpiration. But the *fruit* do not have that capacity, so irrigation for in-day cooling is *only* of use when fruit are present.

There was a good discussion regarding the value of using tensiometers to monitor and manage soil moisture and schedule irrigation. Carolyn noted that these devices were used to schedule irrigation at both State Bog and Rocky in 2015. State Bog had a record crop and was noticeably drier in previously wet areas while Rocky had an above average crop with a single irrigation for the whole summer and despite having fairy ring, scale damage, and being badly in need of sanding! Some growers in the room highly recommended the use of tensiometers.

Equipment

There was some discussion of revolution time of popup heads. It was noted that this should be uniform based on design. However, some reported seeing up to 4 min. for a revolution on some heads. These heads are gear driven rotors and in a well pressurized system one revolution should take 2:15 minutes +/- a few seconds. A grower shared that his are +/- 6 seconds. Longer and variable revolution times may be due to variable system pressure. The key in using these heads with chemigation is to have sufficient injection time. An injection time of 6:45 minutes should assure at least three revolutions (and slower heads will get at least one revolution).

There was a brief discussion of cycling irrigation in frost management. The upshot was that those who have done so will continue but many others still seemed skeptical of this practice.

Nutrition

Carolyn reported on the Nutrient Management regulation that will require growers of more than 10 acres to have a nutrient management plan in place prior to 2016 fertilizer applications. The regulation also includes a mandate for record keeping and is based on management units (areas that are treated similarly - this could be a cultivar or an area under one chemigation system depending on how you manage nutrients). Growers will have to keep records of what has been applied and what tests have been done. Education on this regulation and nutrient plans will happen at the Station's January meeting and at the CCCGA winter meeting in March. CCCGA is also working on a module for the BOGS program that will generate a plan based on growers input information and that can be used to compile the required records.

Carolyn reminded everybody that fall fertilizer (post harvest) is part of the following year's record, since the application is made for the next crop.

There was a brief discussion regarding the utility of liquid fertilizers particularly in light of improved chemigation systems. Liquid fertilizers should be more efficient and may allow for lower rates. They should not pose any unique environmental hazards if they are placed on target since they will be taken up rapidly or will attach to soil particles similarly to other soluble fertilizers.

There was also a brief discussion about the fertilization program in new plantings, specifically on how to encourage vining-in of areas that are not completely filled in, while using a fertilization program that encourages a good crop. Comments included: fertilize heavily and often, add more nitrogen, sand the bog. One grower commented that, if a bed is not completely filled in after 4 years, there could also be a drainage problem.

Note: Product trade names are used for convenience and are not meant as an endorsement of any particular product.

CAROLYN DEMORANVILLE AND STATION FACULTY AND STAFF

UMass Cranberry Mgmt. Update - January 19, 2016 - 7:30-4 - Rosebrook, Wareham

MEETING SCHEDULE –

7:30	Registration (with coffee)	11:25	Fruit Rot Management and Last Year Without Bravo - Erika Saalau Rojas
8:00	What's new? - Carolyn DeMoranville, Director	12:15	LUNCH BREAK (on your own)
8:15	Frost and Irrigation Use - Peter Jeranyama	1:30	Insect Pest Management: Scale Update, Winter Moth and New CFW Recommendations – Martha Sylvia
8:45	Dodder Management/Herbicide Use Updates - Hilary Sandler	2:00	Bumble Bee Ecology - Andrea Couto
9:25	Weed Management Research Update - Katie Ghantous	2:30	Cranberry Pollination Research Program - Anne Averill
10:00	COFFEE BREAK	3:15	Grower Panel on Late Water - Participants TBD
10:30	Building a Nutrient Management Plan - Carolyn DeMoranville and Hotze Wijnja, MDAR	4:00	Wrap-up and Paperwork

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Please register for the meeting using this form.
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IN THIS EDITION:

- Notes from the Crop Summit
- Sign up to receive the newsletter in 2016
- Agenda for the Management Update meeting
- Sign up to attend the Management Update meeting on January 19th

Come to the January 19th meeting!

Learn how to comply with the new State Nutrient Management Regulation!

Get a copy of the new Weed ID Guide and save the shipping charge!

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