Cranberry Station Newsletter

DECEMBER 2006

UMass Cranberry Station
1 State Bog Road
P.O. Box 569
East Wareham, MA 02538
http://www.umass.edu/cranberry

The 2006 Year in Review - Notes from the Fourth Annual Cranberry Summit

On December 13, a group of Massachusetts growers, handlers, and researchers came together at the Cranberry Station to discuss the 2006 growing season. We discussed management challenges, research and education needs, and as always — the weather. This is a summary of the discussion arranged by the topics covered.

Weather

Weather in 2006 was fairly average with the exception of flooding rains in early June (up to 7 inches of rain in 36 hours were reported). This flooding rain was 'blamed' for both good and bad outcomes:

Good — 1) Excellent fruit quality, better than the forecast, could be attributed to floods changing the timing of bloom and/or fungal activity so that they were out of synch. But Frank noted that good quality could also be attributed to few extremely hot days this summer. 2) Condensed bloom made it easier to time CFW sprays. 3) Some insects appear to have been controlled by the flooding.

Bad — 1) Some bogs were under water for 36+ hours (and some as many as 5 days) — these had poor crops (one grower estimated 60-80 bbl/A loss on flooded bogs compared to non-flooded). 2) Post-flooding saturation of the soil (for up to 2-3 weeks after the event) resulted in poor nutrient uptake due to poor oxygenation and low soil temperatures. 3) Wet conditions and large fertilizer application (in anticipation of high crops) led to rank vine growth.

Pollination

Inspection of bee hives showed 30-40% were below the strength needed for good pollination. This is a problem nationwide - migratory bees are stressed by migration, parasites, and diseases. Low strength hives look active but much of that activity may be related to hive survival, not crop pollination. Questions were raised regarding stress related to pollinating lowbush blueberries in Maine prior to coming to MA for cranberries. There was a call for more inspections, perhaps organized by CCCGA. Growers also indicated that they may need to look for other honeybee sources that come in 'fresh'. Brian Wick reported that pollination would be a topic covered at the CCCGA winter meeting in March.

Growers were not impressed with the low activity of purchased bumble bee hives in general.

Diseases

One grower reported his best quality ever with fungicide treatments on 6/21, 7/5, and 7/15. Frank Caruso stated that this is just about perfect timing. Between rain earlier in the month compressing bloom and then good weather later so that optimum treatment timing was possible, control was optimized. In many seasons, we know what our timing should be but cannot get the sprays on due to rain, fog, wind, etc.

In general it was not a bad year for diseases in 2006. However, be on the look out for Phytophthora root rot in 2007 after the wet spring in 2006. Also, Frank noted that conditions that promote vine overgrowth are great for disease development - thick vines hold moisture providing excellent fungal habitat.

One grower noted significant upright dieback symptoms occurring in early September. The general

incidence of this disease industry-wide was low in 2006.

There were fewer reports of cat-facing (a flattened area near the calyx end) on fruit this year compared to the frequent reports in 2005. We do not know the cause of this except that whatever it is happens right around the time of fruit set.

There will be a new fruit rot fungicide, Indar, available in 2007. This fungicide will be registered for fruit rot and hopefully, fairy ring control.

Weeds

Dodder control / Kerb

Kerb was available in 2006 through a Section 18 permit - request for renewal in 2007 will be submitted. A full label is in the works. IR-4 has hired an additional person to work on preparing the petition to EPA for Kerb. It is anticipated that the package should be submitted to EPA in the next few months. Timing of application was discussed. Kerb is most effective when applied prior to dodder germination (some effectiveness against very young dodder seedlings) so scouting for early seedlings is effective only if you really are seeing the very first seedlings germinate, then apply the material prior to or very soon after the germination of the majority of the population. Kerb has good residual properties so going a bit early could hedge your bets.

We are still working out the proper protocols for using the new dodder bioherbicide, Smolder. Much was learned about the material in trials performed on growers' beds in 2006, but more trials will be conducted in 2007. There will be a presentation at the Station's update meeting (Jan. 31) on our results and experiences with using Smolder in 2006.

Other weeds/herbicides

Wild bean remains a problem for some.

Devrinol DF - rate questions were asked. Good results were reported by many with 12 lb/A but some grasses may not be controlled.

Brambles remain a major problem as does poison ivy. Hilary reports some potential future controls for brambles and briars but nothing promising for poison ivy at this point.

Insects - insecticides

Early spring insects. In general, insect numbers were down in 2006. However, there were substantial early infestations of winter moth and gypsy moth was out in huge numbers on many bogs. As a result, most growers began their spring spray regimen about 10 days earlier than in 2005.

In general, both winter moth and gypsy moth were both controlled by sprays targeted at gypsy moth. The flooding rains in June controlled any remaining insects including cranberry weevil. Due to their cyclic nature and high viral pressure in 2006, we expect gypsy moth populations to be down in 2007. However, flights of winter moth continue to be strong. Winter moth larvae tunnel into and hollow out buds - we have seen this damage on bogs. Most likely the damage occurs prior to May 20. However, we do not have good sampling protocols or threshold information, nor do we know if they lay eggs on the bog or if the larval stage moves onto the bog later. Most likely, sprays for other insects are controlling winter moth; they are susceptible to most insecticides used in the spring if they are treated before they tunnel into the buds. We do not know if flooding is an effective control for winter moth. While tent caterpillars have been seen on bogs, no feeding has been observed. If you do observe feeding by tent caterpillars in 2007, please call Anne or Marty.

Black Headed Fireworm (BHF) was out early in 2006 at some locations, treatments were needed by mid-May, since the larvae had pupated by month's end. This pest pupates in 2 weeks so the window for spring scouting and treatment is small; you need to be scouting for this pest by the 2nd to 3rd week of May. In general, BHF was not a big problem in 2006. Intrepid worked well on this pest.

Cranberry fruitworm (CFW) numbers were generally down in 2006 but variable even within bogs. Ben Lear and Stevens tend to be targets of this insect, likely due to rapid fruit sizing after pollination. In 2006, bloom was condensed into a shorter period than in 2005. This may have been related to the flooding rains in June. As a result, it was easier to monitor percent out-of-bloom in 2006 than in many past years. CFW sprays timed using this method appeared quite effective. Major research efforts are being undertaken to find

additional control options for CFW, which remains our largest insect pest challenge. Growers expressed concern about resistance development for CFW. Anne Averill indicated that this would be unlikely due to the large numbers of insects that are in the woods (off bog) during any spray application. She indicated that resistance development was more of a concern in BHF management since this insect stays on-bog and has multiple generations each season.

Cranberry weevil populations were down in 2006. This was particularly true for the summer (post-bloom) generation.

Sparganothis fruitworm was active from June until August. Despite sprays targeted at this insect, flight numbers were high. Some very large moth populations were reported but corresponding larval damage was not seen.

Flea beetles populations were very high in 2006, appearing early and observed into September. Many growers sprayed for this pest late into the season, reducing but not eliminating infestations. Counts of 10 beetles per sweep set could be tolerated but many growers had higher counts and opted to treat. This is an insect that has many related species on other crops. Anne plans to look at other crops and determine possible low-risk control options that can be tested against this pest.

Other insects: Yellow headed fireworm was observed in large numbers on a bog in Carver. Tipworm was observed in greater numbers than in recent years.

Physiology - Winter management

The question was asked — "How will the mild fall affect decisions and recommendations for the winter flood?"

In general, MA growers have gotten into a pattern of keeping the bogs out of flood when winterkill conditions are not present (soil not frozen, temperatures around freezing or above). This is different from past decades here and different from management in WI and NJ. In WI, floods go on early due to cold conditions and remain through the winter, with water removed from beneath the ice once a solid layer has formed. In NJ, floods go on in December and remain through the winter. In MA, we tend to wait as long as possible to apply the flood, then release and reflood at least once.

We know that we need to accumulate chilling hours (between 32°F and 45°F for somewhere about 1200 to 1500 hours). We also know that we can lose chilling if temperatures are above 55°F. So if it is cool but not cold, leaving the water off should be ok. However, two points of warning:

1) After chilling is complete (about mid-January), any warm days will decrease the hardiness of the buds — this can result in early frost sensitivity later. Cold temperature is the only thing holding the buds back after chilling is complete. Keeping a flood in place can buffer against warm temperatures in late winter.

2) If an unexpected cold event occurs while the plants are out of flood, the plants may be 'shocked' into losing some hardiness. We saw this in an experiment where we looked at bud hardiness monthly on about the 15th of the month for each month from November through March. Buds were quite hardy in November that year, but in mid-December had become *less* hardy. Looking back on the weather, we noted that the overnight temperature had fallen to 9°F on December 7. It is likely that this temperature was low enough to almost damage the plants, and that in response to this sub-lethal stress, they lost some of their dormancy/ hardiness. So although it was only cold for one night, and the soil did not freeze, we came very close to having damage. We saw a similar occurrence in the 1989-1990 winter where an early December east coast cold snap after a very warm fall caught growers off guard and resulted in poor 1990 crops in MA and NJ.

So - the best advice in a warm fall — when the temperatures start to drop below freezing, act quickly rather than waiting the normally recommended 2-3 days for predicted winterkill conditions. There is still much unknown when it comes to plant dormancy in general, so we are working as best we can in this 'black box'.

Irrigation/water management

Growers provided testimonials regarding the excellent utility of water level floats. These are low-tech, low-cost tools that allow you to see the height of the water table in your bog. Growers were surprised that their

bogs were wetter than they thought and most indicated that when using floats, they irrigated less frequently and for shorter durations. They also reported crop increases that they attributed to installing the floats and using them to manage irrigation scheduling. At the Cranberry Station, crop increase was observed in the second season after float implementation — in the first season rooting depth increased. [Instructions for building, installing, and using floats are available from the Cranberry Station.]

Carolyn reviewed the research on irrigation done with Bruce Lampinen. They found that when bogs were too wet, fruit retention declined. Saturated soil conditions could also induce yellow vine syndrome (as could soil that was too dry).

The use of intermittent sprinkling with auto-starting systems was discussed. So far it looks good for frost protection but no definitive endorsements yet. Growers are using data logging to determine cost and water use savings to be realized. Questions remain as to what start and stop temperatures should be used for this purpose. Questions remain about what sensors to use. These topics will be addressed at the Cranberry Station's January meeting.

Most reported infrequent harvester damage to pop-up sprinkler heads. However, this is a possibility if heads are not installed deep enough.

We discussed the enormous importance of water management to the future of the MA cranberry industry. Water is important on many levels — quality, access, and proper use. Many agreed with Chip Morse, that overuse of water is confounding our nutrition management programs such that we get into situations of vine overgrowth and then must try to restore normal upright growth. This is particularly an issue for Stevens. Applications of heavy layers of sand are costly and minimally effective. Carolyn suggested that growers might consider inserting cycles of mowing on overgrown bogs as a possibility since traditional pruning just changes the density of the canopy and does not address vine length. You would lose the crop that year but have a nice even stand for the next year that should compensate for the crop loss — that is, on average over several years, you would make up for the zero crop year with bigger crops in years 2 and 3, etc. All agreed that irrigation and flood management are important areas for future research.

General

The potential utility of the Ruby Slipper harvester was discussed. All test users were pleased with speed and cleanliness of harvest and minimal impact on fruit quality. High rates of adoption are expected in WI.

There were some excellent crops out there in 2006 - as high as 433 bbl/A on Ben Lear and 388 bbl/A on Stevens were reported, along with close to 250 bbl/A on Early Black and ~300 bbl/A on Howes. In general, growers agreed that their 'top' acres were back to pre-marketing order productivity of >200 bbl/A.

Growers noted that on bogs where they can control the water, they have the best crops — these bogs are not overly wet and have good even subgrades. Where there was too much water (due to inability to drain after spring rains), vines were overgrown and crops were down.

Future research and education

A list of topics was presented for comment — please feel free to let us know what you think about these suggested priorities and other areas of need!

- Intermittent sprinkling for frost protection
- Temperature sensing technology - glass thermometers vs. sensors
- Irrigation and nutrition interaction
- Soil moisture monitoring
- Mist blowers
- Bog renovation
- Revision of BMPs
- Revision of Modern Cranberry Cultivation Book

CAROLYN DEMORANVILLE
STATION DIRECTOR

DR. CAROLYN DEMORANVILLE
STATION DIRECTOR

YIELD AND FRUIT COMPOSITION OF EARLY BLACK AND STEVENS CRANBERRY FOLLOWING SAND APPLICATION

Sanding of beds is a common practice in cranberry production in order to stimulate growth and to reduce pests. However, little information exists in the literature concerning the effects of sanding on growth and fruit production. Results from sanding studies have varied among cultivars and regions. We designed this study to determine how yield, fruit composition, and vegetative growth were affected by sanding in Early Black and Stevens.

Materials and Methods

On 23 March 2005, varying sanding treatments were applied to 'Early Black' and 'Stevens' vines on State Bog. The two cultivars were on separate sections of State Bog, both of which had not been sanded for at least 5 years. There were three sanding treatment levels (4.5, 3.0, and 1.5 cm depths, which is about 1.7, 1.2, and 0.6 inches) and a non-sanded control (0 cm). Berries were harvested on 22 September 2005 (both cultivars), 22 September 2006 (Early Black), and 4 October 2006 (Stevens). Berries were counted, weighed, and frozen for total anthocyanin (TAcy) analysis. TAcy values were determined according to the methodology used by Ocean Spray Cranberries, Inc.

Results

Early Black: In the year of sand application (2005), yield decreased in Early Black with increased sand depths, from about 150 bbl/acre in the non-sanded (control) plots down to about 20 bbl/acre in the plots sanded with 4.5 cm of sand (Fig. 1). Tacy increased in the sanded plots, but even with the color incentive per acre gross returns declined from $6000 in the non-sanded plots to below $1000 in the plots sanded with 4.5 cm of sand.

In 2006, yield of Early Black was only slightly affected by the sanding treatments, and anthocyanin concentration was still greater in the higher sanding treatments (Fig 1.). Returns per acre were not affected by sanding treatments in the year after sanding.

Stevens: Yield of Stevens was variable in 2005, perhaps due to a high population of fruit worm on the bog. The non-sanded plots produced about 225 bbl/acre, while the heaviest sanding depth produced just over 100 bbl/acre. Per acre gross returns ranged from about $9000 to just above $4000 (Fig. 1). The early harvest resulted in fruit of very low anthocyanin concentration, even though the vine was very sparse at the higher sanding levels.

In the year after sanding (2006) the yield per acre was generally not affected by the light and medium sanding levels (1.5 and 3.0 cm), but was highly reduced by the highest sanding level (4.5 cm). The fruit were harvested in early October but the anthocyanin concentration was very low, resulting in no color incentive. The returns per acre were approximately $7000 for the non-sanding plots as well as those sanded at 1.5 and 3.0 cm, but the plots sanded with 4.5 cm sand resulted in per acre gross returns below $2000.

Conclusions

This data suggests that heavy sanding of Stevens should be avoided as the yield impacts carry over to at least a second year. In a NJ study, heavy sanding of Stevens was reported to decrease yield several years after sand application (Davenport and Shiffhauer, 2000).

Early Blacks can be sanded heavily without yield being impacted in future years, however the per acre gross returns are drastically reduced in the year of sanding. The ability of Early Blacks to produce high yields in the year after sanding is likely dependent on site and growing season, as yields were reduced for a longer period of time in the NJ study (Davenport and Shiffhauer, 2000).

In conclusion, heavy sanding of both Early Blacks and Stevens should be avoided due to large yield decreases in multiple years. Yield has been shown to increase with sanding in a study in Oregon (Strik and Poole, 1995) but we did not see that result in Stevens or Early Blacks, so we recommend that growers in MA sand with caution.

Literature Cited

Davenport, Joan R. and Daniel E. Schiffhauer. 2000. Cultivar Influences Cranberry Response to Surface Sanding. HortScience 35(1): 53-54.

Strick, B.C. and Arthur Poole. 1995. Does Sand Application to Soil Surface Benefit Cranberry Production? HortScience 30(1): 47-49.

Figure 1

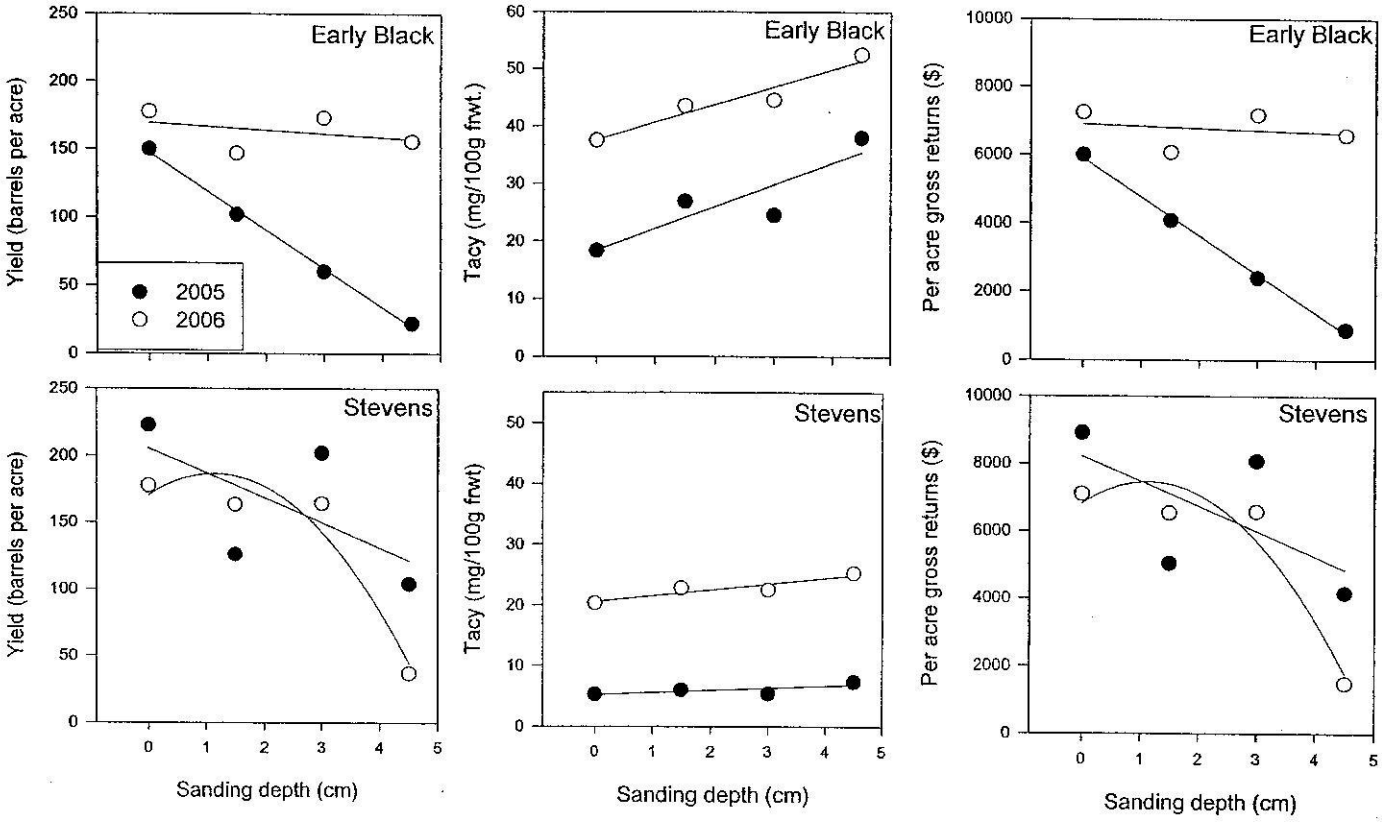

Figure1: The effect of sand application on yeild per acre, anthocyanin concentration (TAcy), and per acre gross returns of Easrly Black and Stevens cranberry in the year of sanding (2005) and the year following sanding (2006). Returns for both years were calculated based on the estimate for the 2005 crop of $40 per barrel with a $0.10 incentive for every mg of anthocyanin over 30 mg/100g.

MICHELLE SALVAS AND JUSTINE VANDEN HEUVEL
PHYSIOLOGY LAB

CRANBERRY MANAGEMENT UPDATE

Wednesday - Jan. 31, 2007 7:30 AM - 4:00 PM

This educational program is a streamlined session with "how- to" information for growing cranberries effectively and economically by implementing the latest research.

This meeting will offer an opportunity for the Cranberry Station faculty and staff to present areas of research that have reached the grower-implementation stage. $20.00 charge includes a morning coffee, a mid- morning coffee break and handouts.

4 contact hours are being requested for Pesticide recertification credits for the cranberry category.

SCHEDULE ON BACK COVER
SIGN-UP ON NEXT PAGE

CRANBERRY STATION NEWSLETTER & REVISED 2007 CHART BOOK RENEWAL

YOU MUST RETURN THIS FORM EACH YEAR TO STAY ON OUR MAILING LIST!!

The Cranberry Station Newsletter is provided **free to all MA growers, cranberry researchers and IPM consultants nationwide. Annual subscription fee of $15** is required for **out-of-state growers and industry personnel.** All persons wishing to receive this newsletter (whether paying or not) must complete and return this renewal form to maintain a subscription. Include a check (made out to UMass) with the renewal form if you are out-of-state or are industry personnel. **All subscriptions sent by email, including out-of-state and or industry personnel are FREE .**

Everyone must respond to this notice if you have not done so already this fall/ winter or your name will be taken off of our mailing list for 2007!

NAME _____

COMPANY _____

ADDRESS _____

TOWN _____

ZIP _____

PHONE _____

EMAIL: _____

No. of acres: _____

Please check one:

Owner _____
Employee _____
Researcher _____
Consultant _____
Industry _____
Private sector _____

Return to: UMass Cranberry Station
P.O. Box 569
East Wareham, MA 02538

Change of address? (Y or N) _____

Please Choose One!!! Postal delivery _____ or Email _____

Registration Form for Cranberry Management Update
Wednesday, January 31, 2007 7:30 AM - 4 PM
Radisson Hotel Plymouth Harbor

Please register for the meeting using this form.

COMPANY _____

CONTACT _____

PHONE _____

NAMES OF ATTENDEES _____

_____

_____

_____

Attach additional sheets as necessary.

Return with payment by:
January 24th, 2007

Include check made out to:
UMASS
In the amount of:
$20 per person.

Return to:
UMass Cranberry Station
P.O. Box 569
East Wareham, MA 02538

Cranberry Management Update
January 31, 2007

7:30 am	Registration / coffee	
8:00 am	Cranberry Station update - State Bog Renovation	Carolyn DeMoranville
8:30 am	Smolder update	Sylvan Representatives
9:00 am	Cranberry Disease Update	Frank Caruso
9:30 am	Cranberry Weed IPM Update	Hilary Sandler
10:10 am	COFFEE BREAK	
10:40 am	WI weed research	Jed Colquhoun, U. of Wisconsin
11:30 am	SARE sanding/pruning study	Brett Suhayda/Carolyn DeMoranville
11:45 am	Cranberry nutrition update	Carolyn DeMoranville
Noon	LUNCH (on your own)	
1:30 pm	Mini-workshop Frost protection / Sensor technologies	Carolyn DeMoranville, KC Enterprises, Pierre Ballester and Growers
3:00 pm	Cranberry insects Update	Anne Averill / Marty Sylvia
3:50 pm	Paper work for Credits	

UMASS EXTENSION
UNIVERSITY OF MASSACHUSETTS
P.O. BOX 569
EAST WAREHAM, MA 02538

OFFICIAL BUSINESS