

# CRANBERRY VINE

WSU Long Beach Research and Extension Unit  
2907 Pioneer Road • Long Beach, WA 98631 • 360-642-2031 • pattenk@wsu.edu

**December 2009**

## Meetings

**Washington Cranberry Winter Workshop.**  
Saint Lawrence Catholic Church, Raymond,  
Sunday 1:00 to 4:00 pm, January 31, 2010.  
Pesticide credits will be given.

Aside from myself, speakers will include LeRoy Kummer, Ocean Spray Agriculture Scientist from Wisconsin, and Joan Davenport, WSU Soil Scientist. Mr. Kummer will present on the key production practices that have made Wisconsin growers so successful. Dr. Davenport will discuss all the latest research on cranberry soil and plant nutrition.

Please note that this is a Sunday. I had to move from Saturday to accommodate our out-of-state speaker.

**Oregon Cranberry Winter Workshop.**  
Tuesday, all day, February 2, 2010. Sprague Community Theater, Bandon. This will be followed by a Native Pollinator Workshop the next day. Call Linda White 541-572-5263, OSU Extension, for details.

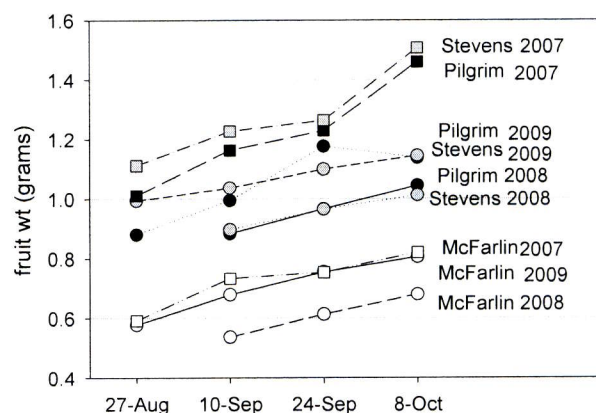
**British Columbia Cranberry Congress.**  
Tuesday, January 19th, 2010, Call BC Cranberry Marketing Commission, 604-307-1046 for details.

**Grayland spring workshop for pesticide credit.** North Cove Grange Hall, 6:30 to 8:30 pm April 1, 2010. Weevil and girdler control,

new insecticides, herbicides and fungicides for 2010, frost protection overview, and new varieties.

## Cranberry Crop and Varieties

**2009 Crop.** This year's cranberry crop was an improvement over last year. Although we had a good pollination season, our main growing season wasn't warm or sunny enough to obtain adequate fruit size. The following graph shows average fruit size monitored on five separate farms in Long Beach for the past three years.



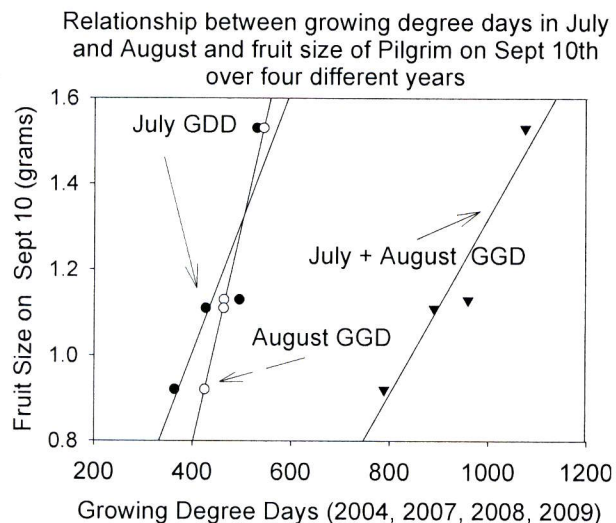
There are some very interesting features of the graph. One is similar rate of fruit growth (slope of the line) across years and varieties between late August and mid-September. This is an average of 0.05 grams per fruit /week. For a 200 bbl/ac crop, this is an increase in weight of ~ 10 bbl/wk. One of the



consequences of this similarity in growth rate is that fruit size and hence yield is pretty much a done deal by the end of August. Small fruit in late August equates to small fruit in October. It is interesting to note that for Stevens, fruit size in October 2008 equaled size in late August 2009, and fruit size in October 2009 equaled size in late August 2007.

If you know fruit number/ft sq and their average weight in late August for a given bed, you can approximate final yield. For example 200 fruit/ft sq @ ~1 g each on September 1 will result in a final yield of 240 grams/ft sq or ~ 240 bbl/ac. If fruit size is a done deal by early September, what is the determining factor for obtaining large size fruit by that date?

The following graph plots average fruit size of Pilgrim fruit harvested on Sept 10<sup>th</sup> in 2004, 2007, 2008 and 2009 from the same beds as a function of how warm July or August was for that year (based on growing degree days (GDD)). The correlation is an almost perfect straight line (almost too perfect to be real).



This relationship was made embarrassingly clear to me this summer when I brought Crimson Queen and Mullica Queen fruit from our Washington trials up to the BC summer

field day on August 18<sup>th</sup>. The BC fruit was literally twice the size of WA fruit.

Another point of interest is how fruit size is conserved on McFarlin. We have seen this on other variety trials over the years. Small-fruited varieties tend to have less variation in size across years than larger fruited varieties.

So what is the bottom line? Washington growers are challenged by a cold wet pollination season, resulting in less fruit, and cool summers resulting in small fruit at harvest. Good growing practices and using the most promising genetics are about the only two things you can do to help mitigate for these less than ideal growing conditions.

**Cranberry Varieties:** The following table shows five years of the performance from the released selections from our 2003 test planting. Overall, Pilgrim, Willapa Red and Crimson Queen continue to look good, as do several numbered selections from Rutgers that I haven't included in the table. Some of these selections are scheduled for release in the future.

Variety	bbl/ac				
	2005	2006	2007	2008	2009
Crimson Queen	77	179	347	242	293
Mullica Queen	23	20	252	178	206
Pilgrim	257	202	327	345	334
Stevens		1	48	209	246
Willapa Red	150	217	383	229	376

I've written in detail about these selections before, so I only provide an update based on 2009 observations. I continue to be most impressed by Willapa Red. Although fruit size is small (a little over a gram/fruit), its production always has been at or near the top and fruit rot near the bottom.

This year we looked at yield components (following table) to try to account for why Willapa Red is a top performer. A combination of higher numbers of fruit per upright, percent fruit upright and upright density appears to more than compensate for small fruit size. Fruit set is also high.

One particular aspect of fruit set that is very exciting is that we obtained 34% set when we caged out honey bees for 5 weeks during bloom. If this was not an anomaly it could be a partial solution for our typically poor pollination weather.

Variety	Yield Component			
	# fruit/ upright	#upright/ ft <sup>2</sup>	% fruiting uprights	% fruit set
Crimson Queen	1.5	178	74	55
Mullica Queen	1.4	175	63	53
Pilgrim	1.8	214	89	51
Stevens	1.6	170	76	49
Willapa Red	1.9	254	78	59

Another aspect of new varieties that doesn't normally get much attention is runner production. Over-fertilizing some varieties can produce copious amounts of runners, while others seem almost immune. Crimson Queen, Mullica Queen, Pilgrim, Steven and Willapa Red had 31, 13, 2, 15 and 3 runners/m<sup>2</sup> respectively.

For 2010 planting recommendations, Crimson Queen appears to be more suited to the PNW than Mullica Queen. Willapa Red won't be available in quantities for a few more years, but some vines for rooted cuttings are available now. They are not patent protected. Pilgrim vines are available and highly recommended, but with the caveats of making sure that you know what you are buying.

### **Cranberry variety purity and DNA testing.**

Every grower in Washington has most likely had tainted vines by planting off-type low-producing varieties. The expense of planting, waiting, renovating and re-planting and waiting again, or of just making do with production at half of what it could be, is very significant. DNA testing can be used to help minimize off-types, but it is expensive and you are unlikely to find anything close to 100%

Purity of the original Pilgrim sources for cranberry plantings in Washington			
Location	Source of vines	Date planted	% DNA typed Pilgrim in 2009
Long Beach	WI or BC	1980's	50%
Long Beach	WI or BC	1980's	0%
Grayland	BC	1980	0%
Grayland	BC	1982	0%
Long Beach	BC	1991	66%
Long Beach	BC	1991	85%
Long Beach	BC	1991	85%
Chinook	WI	2000	88%

pure.

In 2008 we conducted a study with Ocean Spray examining the DNA purity of Stevens beds. There were a lot of off-types, and although they weren't always associated with lower production, it was difficult to find many beds of high-producing off-type Stevens. This data on Stevens, and a few surprising non-Pilgrim DNA samples taken off Pilgrim beds that growers tested on their own, led me to conduct a similar experiment on Pilgrims in 2009.

Samples were taken from beds of many of the original early plantings and any new plantings from new sources. I avoided beds that were obvious off-types. The results are presented below.

This table indicates that purity of the initial plantings ranged from 0 to 85%<sup>+</sup>. Based on



similar tests done on Pilgrim beds in other growing areas, 80 to 90% purity is about as

good as you can get even for high producing

Purity of Pilgrim uprights and runners off the same bed from vines collected in Washington		
Bed	Pilgrim Purity (%)	
	Uprights	Runners
a11	100%	0%
a5	33%	50%
s1	25%	0%
g1	100%	0%
c40	50%	0%

beds. I then traced what happened to bed purity over time as growers established beds from prunings from their original planting.

A planting established from runners from the bed with 50% purity had 0% Pilgrim. This makes sense, as when I tested the runners off the 50% purity bed none were Pilgrim. Not surprisingly, beds established from beds with 0% Pilgrim were 0% Pilgrims. Beds established from the two 85% Pilgrim beds varied all over the place. The initial plantings ranged from 0 to 40 to 100%. We also traced purity of these second generation beds and some third generation beds. There continued to be a lot of variability but with each subsequent generation of planting of beds from runners, the purity decreased.

On several of the beds I took samples from, I also compared the purity of runners vs. uprights. In four out of five of these beds, none of the runners were Pilgrims (see table below).

Although I was hoping for less variability and a little cleaner and more definitive data, these overall results clearly suggest that growers should try to avoid using prunings to establish a new planting. Using mowed vines will assure you at least a similar level of the purity as the bed you took them from.

DNA sampling is not a perfect resolution to figuring out what to plant. A typical cranberry

bed has over 10 million uprights per acre. By only taking a few samples, there is a likelihood that the results will be non-representative. At a \$100/sample, one can't afford to take enough data to be 100% confident of the results.

Not having pure beds doesn't imply that yield will be low. In fact, some of the highest yielding beds in the state and county that consistently get more than 300 to 400 bbl/ac have only 30 to 50% Pilgrim DNA. I was surprised that numerous beds that had good yield and had fruit that looked like Pilgrim came back with low purity level. If a Pilgrim bed has a lot of runners and overgrowth, I would advise against using prunings from that bed for a new planting. There is a high risk of planting non-productive vines.

One solution to obtaining good vines for planting is to establish your own nursery of pure vines and then grow them like hay, mowing every year. We have started pure Pilgrim, Stevens and Willapa Red beds at the PCCRF farm for this purpose.

## Cranberry Pest Management

### Cranberry Pest Management Guide

**EB0845:** This annually updated guide is now only available on-line and can be downloaded for free as a PDF file. The 16 page 2010 version is already out and can be found at <http://cru.cahe.wsu.edu/CEPublications/eb0845/eb0845e.pdf>

### PNW Insect, Weed and Disease Control Handbooks.

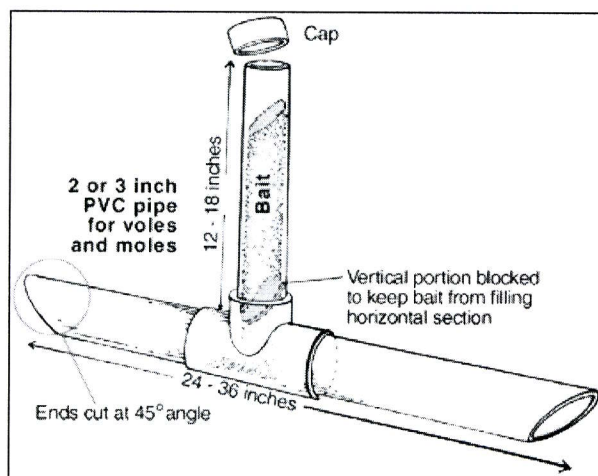
These PNW pest control handbooks are annually updated. See: [http://www.ipmnet.org/IPM\\_Handbooks.htm](http://www.ipmnet.org/IPM_Handbooks.htm)

**Indar and Abound** fungicides are reasonably new and haven't been used much by growers. These products work great on cottonball and help suppress fruit rot when applied mid-bloom. We just finished our third year of trials comparing them to traditional fungicides for

effects on yield and field and storage rot. Results have been inconsistent across beds, varieties and years, but we have noted a marked increase in yield in several beds. It is still too early to make any definitive recommendations.

**Vole control.** Winter/spring is a good time for vole control. They are hungry and more susceptible to baits. Their holes ruin dikes and they can leave a trail of destruction in their runs. They can have many generations per year and one pair can turn into more than one hundred by the end of the summer.

No anticoagulant baits are registered for on-bed use, but they can be used on dikes (non-crop agriculture area). To avoid non-target mammals from getting the bait, use a bait station like the one on the following page.



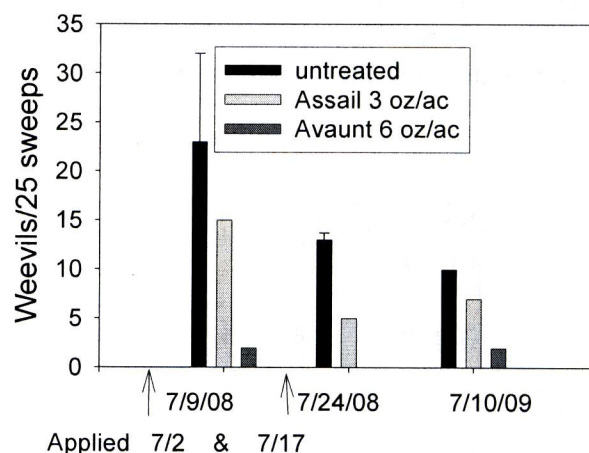
Because anticoagulants take time, bait must be reapplied until feeding is no longer noticed.

**New insect pest.** Spotted *Drosophila* fruit fly has recently invaded the PNW small fruit industry. We don't know about its impact on cranberries yet, but for other fruits it is very serious. It has multiple generations and lays eggs within the fruit, resulting in secondary decay and small pale maggots in intact fruit. Control will be problematic. Be on the

lookout next summer. If you suspect something, call me ASAP.

**Research sites still needed:** We need good sites for weevil, girdler and fireworm research. Crop compensation will be available.

**Blackvine Weevil:** 2009 was another banner year for blackvine weevil research. We had two years to assess Avaunt and Assail, in comparison to commercial Cryolite bait, nematodes and Admire. Growers also got their first real field assessment of these new insecticides.



Avaunt is proving to be the insecticide of choice and is providing excellent knockdown/kill of adults. It is generally giving about two weeks of residual control. The figure below shows comparative sweeping data in the year of treatment and the year after.

In this study and several others, Avaunt provided better control than Assail. Overall we found almost no control with weevil bait, and some suppression with Admire and nematodes. In grower fields that we swept this summer we also found good adult control following use of Avaunt via chemigation.

Based on these results, my recommendations are as follows: 1) an aggressive night sweeping program to monitor for first adult emergence and feeding, 2) Avaunt @ 6 oz/ac application at first emergence, 3) night



sweeping 4 to 8 days after treatment to assess if an additional adulticide application is needed, 4) repeat weekly sweeping and adulticides treatments until sweeping counts are at or near zero.

If sweeping data indicates continued high adult counts following chemigation switch to a low volume broadcast application.

Although Avaunt has a lower toxicity to bees than traditional OPs, it should be applied late evening, night or early morning to minimize any potential hazard for more information. The following table indicates relative toxicity of different cranberry insecticide. The lower the relative risk quotient the safer it is to bees.

Insecticide	Bee Toxicity LD50 (µg/ bee)	Rate used Lbs ai/ac	Relative risk quotient (use rate/ toxicity)
Admire	0.0037	0.5	135
Success	0.003	0.15	50
Lorsban	0.06	1.5	25
Diazinon	0.09	2	22
Actara	0.024	0.4	16
Assail	8.09	0.1	0.01
Avaunt	17.32	0.1	0.01
Intrepid	100	0.25	0.002

Recent research from OSU indicates a late summer treatment of an entomopathogenic fungus called *Metarhizium* has been very effective against weevil larvea on cranberry beds. Hopefully this treatment will be an answer for treatment for Cranberry girdler in the future.

**New weevil girdler control options for the future.** Preliminary findings from OSU on weevil and E.S. Cropconsult Ltd. In BC on girdler, using anentomopathogenic fungus

called *Metarhizium*, is indicating that it could be a good option for control in the future.

**Blackheaded Fireworm:** Grower options for using non-OP alternative insecticides for blackheaded fireworm control continues to expand. Success/Entrust, Intrepid, Confirm, Avaunt, Assail and Delegate, are available for fireworm control in 2010.

None of these is as effective through chemigation and as inexpensive the traditional OPs. However, when used according to instruction and with the right timing (need to applied at early instar stage) they can provide good control for most situations. Heavy infestations required multiple treatments.

Our research indicates that overall efficacy is not as good with chemigation as broadcast. Of these compound Delegate at 6 oz/ac has been most comparable to Diazinon. Growers should always have a bee safe product like Intrepid on hand in case they need to treat when bees are on the beds.

If growers have used Avaunt or Assail for weevil control they can expect some fireworm control if the timing was right. They may or may not need to treat again with an OP.

**Weed control.** For sour dock, lotus and clover control, try a winter Stinger application. It is reasonably effective and there is no risk to crops. Sour dock takes several repeat applications. For perennial grasses that green up in early sprin, an application of Select works well.

**New pesticides for 2010.** A new herbicide and insecticide are in the works for the 2010 season. I am really excited about the herbicide. It is premature to mention these chemistries until we obtain labels. You'll be notified as soon as we know they are available.

## Miscellaneous:

**Sprinkler head repairs:** The brass nozzles on impact sprinklers don't last forever. Worn nozzles don't provide the uniformity you need for chemigation. Down time in the winter is a good time to take the appropriate size drill bit, 7/64", 1/8", or 9/64", and test for fit. If there is much wiggle room, replace the nozzle.

**Cold weather.** Our recent cold weather could cause a little trouble for some of the really big buds on hybrid varieties. At this point I don't anticipate a big loss. Growers should check liquid formations of pesticide in their warehouse. Some are subject to separation or breakdown if frozen and could lose effectiveness.

It is a good idea to keep your pesticide storage shed above freezing or separate out your liquid product to a warmer site.

**Pruning.** One of the most common things I see done that will likely result in yield reduction is overzealous pruning. Nicely pruned bed look pretty, but we are not growing lawns. Pruning research in Oregon and elsewhere has clearly shown that heavy pruning reduces yield. The ideal is lightly pruning on alternate years.

Clearly, if you have over-fertilized and need to remove excess runners, pruning is required. However, heavy pruning to remove a few runners is not advised. If you haven't pruned yet, leave a few passes unpruned or light pruned and monitor the results.

**Sanding.** Sections of beds damaged by weevils, girdler, Casoron, or other means can be repaired by spot sanding this winter/spring.

## WEATHER HISTORY

Month	Precipitation					Growing Degree Days				
	2006	2007	2008	2009	20 year average	2006	2007	2008	2009	20 year average
January	20.9	6.9	10.5	9.6	12.2	30	9	4	23	46
February	4.7	10.4	5.4	3.7	7.8	26	33	16	20	45
March	7.8	11.0	9.7	7.7	8.3	29	66	12	10	69
April	4.3	4.1	5.3	4.2	6.3	90	104	43	61	120
May	4.8	2.1	2.5	4.8	3.7	208	205	230	214	248
June	4.7	2.8	2.4	0.7	2.8	345	294	244	361	340
July	0.7	3.6	0.5	0.8	1.2	399	495	364	427	451
August	.03	1.8	4.0	1.6	1.9	332	464	425	463	457
September	1.7	1.2	0.9	3.3	2.0	349	323	326	401	379
October	0.0	11.1	4.9	8.2	7.2	177	152	166	184	215
November	22.6	6.3	11.1	20.3	12.2	78	53	138	71	87
December	12.4	13.2	11.3		12.2	36	20	16		35
<b>Totals</b>	<b>84.7</b>	<b>74.5</b>	<b>68.5</b>		<b>77.8</b>	<b>2099</b>	<b>2217</b>	<b>1984</b>		<b>2490</b>

*Weather incomplete for December, 2009, so 20-year average is based on precipitation and growing degree days between December 1989 and December 2008.*