

WASHINGTON STATE UNIVERSITY
 EXTENSION
World Class. Face to Face.

CRANBERRY VINE

Washington State University • Long Beach Research and Extension Unit
2907 Pioneer Road • Long Beach, WA 98631

December 2012

MEETINGS AND INFORMATION:

Washington Cranberry Winter Workshop: Saint Lawrence Catholic Church, Raymond. Tuesday, February 12, 2013, 1:00 to 4:30 p.m. Three pesticide credits will be given. Aside from the usual presenters, this winter workshop will include Frank Caruso, University of Massachusetts, talking about how to use our new fruit rot control tools; Dave Bryla, USDA Corvallis, presenting his new research on cranberry frost protection, and Kristen Worthington, Ocean Spray, discussing her research on slow release fertilizers.

Oregon Cranberry Winter Workshop: The 2013 Oregon Cranberry School will be held on Thursday, February 14, 2013, at the Sprague Theater in Bandon, Oregon. For more information about the event, contact Bob Donaldson at 541-348-2242.

British Columbia Cranberry Congress: Thursday, February 7th, 2012. Call the BC Cranberry Marketing Commission at 604-307-1046 for details. Speakers include Frank Caruso, Rebecca Harbut and Sheila Fitzpatrick.

Northwest AG Show: January 29 to 31, 2013, Portland Expo Building. If you've never been, it is a great AG show. If you

need pesticide credits, there is a Wednesday morning session in Room D-202 on sprayer technology that might be relevant. For more information, see their website at <http://www.nwagshow.com/seminars.php>

Grayland Spring Workshop for pesticide credit: North Cove Grange Hall, 7:00 to 9:00 p.m., April 17th, 2013.

Family Business Succession Planning Seminar: January 24-26, 2013, Boise, Idaho, Northwest Farm Credit. Learn processes and alternatives to help your family transition the ownership and management of your farming operation. <http://www.farmcredit.com/uploads/2012%20BMC%20Catalog.pdf>

Pesticide Applicator License Renewals: Pesticide Applicator Renewal Notices were just mailed by WSDA. If you still need recertification credits before the end of the year, they are available online at <http://pep.wsu.edu/rct/RecertOnline.html>. Each course is one credit (50 minutes) and only \$15.00, payable by credit card. If you need to take the pesticide applicator's exam, we offer them at the Extension Office in South Bend (360-875-9331) or at WSU Long Beach (360-642-2031).

Cranberry Pest Management Guide: The WSU 2013 Cranberry Pest Management Guide is now available online as a pdf: (<http://cru.cahe.wsu.edu/CEPublications/eb0845e/eb0845e.pdf>). Also see updates to the PNW pest management books.

<http://insects.ippc.orst.edu/pnw/insects>

<http://plant-disease.ippc.orst.edu>

<http://weeds.ippc.orst.edu/pnw/weeds>

Ag Census: Growers are encouraged to complete the Agricultural Census online (www.agcensus.usda.gov) or by mail and return it by February 4, 2013.

PEST MANAGEMENT:

New pesticides for 2013: Quinstar will likely have its Section 18 for yellowweed reissued in OR and WA. Growers will have the same restriction for export market as in 2012. Nothing else is likely going to be new.

Pesticide storage: Winter is a good time to take an inventory of all products and mark the date of purchase to help you rotate your stock. Consider giving away or exchanging those old sacks of various pesticides or fertilizers that you are no longer using. Seal pesticides that are no longer registered in a waterproof container or tote and hold them until the next free WSDA pesticide pickup day.

Weed Control

Additional mixing directions for using Curio

I am convinced that some of the inconsistent weed control we are seeing with Curio is the result of poor agitation of the tank mix. Measuring out a small amount of Curio and then dumping those few water soluble granules into a spray tank or backpack

without first thoroughly dissolving those granules results in a poorly distributed product in the field. Instead, first dissolve your Curio by vigorous shaking with a few cups of water in a sealed container, and then add that to your tank mix. Agitation should continue to assure that the Curio doesn't settle over time.

Winter control of problem weeds

Sour dock / sour grass / sheep sorrel: Suppression can be achieved by repeated Stinger applications @ 8 oz/ac every 6 to 8 weeks in the winter with late February being the last application. This can be followed by spring Casoron to control new seedlings.

Extreme caution is recommended when using Stinger anywhere near the time of bud elongation.

Lotus & Clover: Suppression can be achieved by Stinger applications @ 8 oz/ac in the winter. Lotus control is marginal unless there is canopy exposure during treatment. Additional lotus suppression can be achieved with spring application of Callisto as the canopy develops.

We had our best lotus and clover control with a tank mix of ½ rate of Curio + full rate of Callisto + Quinstar applied early post-emergence in spring or mid-summer.

Buttercup: Curio is a superlative treatment. The treatment window to minimize any potential crop damage is March through mid-April.

Tussock: December timing of full rate of Curio + Callisto worked well in our research trials.

Sedges /Cut grass: Wiping with Roundup can be used for suppression.

Winter grasses (annual bluegrass, sweet vernal, bentgrass): Any grass showing heavy green tissue in the winter or spring can be suppressed or controlled with repeated applications of Select.

Winter biennials (dandelion, catsear): Stinger and 2,4-D G both work well.

Spring and summer control of problem weeds

Salt grass: Multiple applications of Select.

Silverleaf: Multiple applications of Callisto as the canopy develops; will take several years.

Willow seedlings: Callisto when really small, Quinstar if they are bigger.

Annual Rushes (toad rush, louse grass etc.): Callisto or Curio when weeds are small.

St John's Wort (all species): Casoron is useful once the vines have filled in and can handle a decent rate. For new or young plantings use Callisto + Curio as early post-emergent (June).

Yellowweed: Quinstar is superlative; two applications are better than one, but one may be adequate. Early timing is better than late, but success has been noted with mid-summer applications. Expect some suppression in the year of treatment and total control in the year after treatment. For control without Quinstar, consider using Callisto + Curio. This will provide decent suppression in the year of treatment, and some control in the following year, but not permanent control.

Yellowweed - to use or not use Quinstar:

A year of commercial use of Quinstar for yellowweed control is under our belt in Oregon and Washington. Combined across

these, states, out of ~4000 acres of cranberry production there were about 320 acres on which Quinstar was used. Most of this usage was in Oregon. This was ~ 8 to 9% of the total acreage.

What did we learn? I did not hear of any growers having problems with crop phytotoxicity. Control of yellowweed in the year of treatment was unremarkable. I've seen some good suppression to none at all. However, based on the commercial fields treated late in 2011 and our research trial, control in the year following treatment has been exceptional.

It appears that for the next several years we will continue to get a Section 18, but that there will still be the concern over MRL and an inability to get the more attractive export market price for fruit. The question growers should be asking is "Should I use Quinstar in 2013 at the cost of not receiving a premium price for my fruit?" The answer depends on the level of yellowweed infestation. For a few weeds here and there, the answer is no. If the infestation is growing, is >10% of your bed and affecting your harvestable yield, then the answer is yes.

I've generated a table that provides the difference in growers' net returns under different conditions. This assumes \$1/bbl price differential and a cost of \$85/ac to treat an acre twice (chemical plus labor) in year one and no subsequent treatments in year 2 or 3. Since our data indicate one year of treatment will totally suppress yellowweed for several years, only one year of treatment is required. The last column is the sum of what I expect over three years. There are ~ \$1400 and \$2400 increases in returns for 100 and 200 bbl/ac beds, respectively. These projected differences in income are actually fairly conservative. Our data for

severely infested beds suggest that yield returns would increase much more than the 10% that I've listed in the table.

The difference in net grower returns with the use of Quinstar across differently yielding beds.					
Bed yield potential bbl/ac	Difference in net grower returns (\$/ac) with the use of Quinstar compared to no use				
	Yr 1 with no differences in yield	Yr 1 with a 2% increase in yield	Yr 2 with a 5% increase in yield	Yr 2 with a 10% increase in yield	Yrs 1 + 2 + 3 with no effect of yield in yr 1 and a 10% increase in yield in yr 2 & 3
50	-135	73	157	450	765
100	-185	61	315	815	1445
150	-235	49	472	1180	2125
200	-285	37	630	1545	2805
250	-335	25	787	1910	3485

Plant Diseases:

Cottonball: I saw some really serious infestations during harvest this year. This is even on beds treated with Abound during bloom. I believe the problem stems from missed timings on farms with multiple varieties. The early blooming Crimson Queens, Mullica Queens and Grygleskis will be out of sync with the main varieties and a mid-bloom timing of Abound or Indar would be ineffective. If infestation was severe, use two sprays during bloom. The first spraying should be done when 10 to 20 percent of the flowers have opened, the second ~5-8 days later as the remaining flowers open.

On mixed variety farms with some early blooming varieties, spray each variety separately according to its developmental bloom stage. The level of infestation will get progressively worse without treatment. In

most years, protection of the bloom is adequate to prevent crop loss.

On really badly infested beds, growers should consider targeting an application of protectant fungicide during the early shoot elongation. This is when the first stage of infestation occurs.

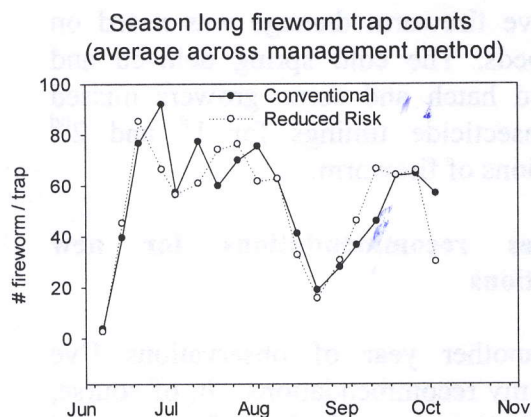
Twig Blight: Several farms had some serious twig blight infestation in 2012. If you did not protect uprights this year, expect an even more serious problem in 2013. Three fungicide applications of Bravo or Manzate applied two weeks apart starting at fruit set are required to clean up a serious infestation. Indar and Abound are also effective against twig blight. Hand-treat areas where sprinkler coverage is less than ideal.

Fruit Rot – Previously I reported about our great results on increasing yield and reducing fruit rot with two mid-bloom applications of Indar + Abound. I should have left well enough alone and not tried to get a fourth year of data. Our 2012 results showed no effect - period. I would be remiss in making the same recommendation without more confirming data.

Insects:

Blackheaded Fireworm: Extensive fireworm damage was noted on some beds. The cool spring resulted in a delayed and extended hatch which caused some growers to miss their insecticide timings for 1st and 2nd generations. With more detailed observations for larvae in hotspots, sweeping and pheromone traps, you should be able to refine your insecticide timings in 2013. In 2012 we began to gather more extensive data on adult populations throughout the season. The figure below details trap counts averaged across five

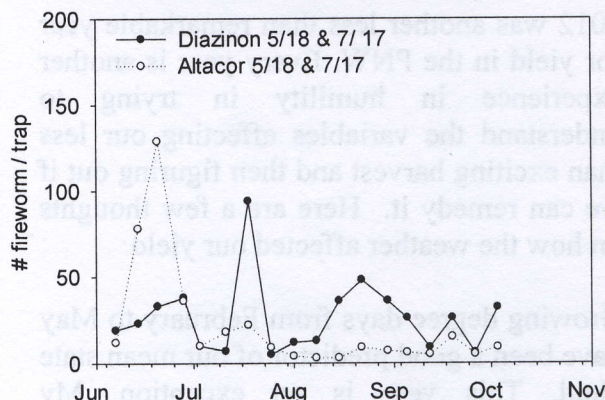
conventional OP-treated and five reduced-risk insecticide treated beds. It is interesting that adult trap counts remained high well into summer/early fall. The eggs laid by these late summer adults don't hatch until next spring. As a consequence, high late summer moth counts result in large first generation larvae populations next May.



Perhaps we are missing the big picture in our fireworm management program. Traditionally, we aim to minimize second generation larvae to avoid damage to tips and fruit. This helps suppress populations but not enough to prevent mid and late summer egg laying. The use of an ovicide like Altacor in mid-July might be a useful tool to prevent mid-summer egg hatch and reduce numbers of mid and late summer adults.

The following figure shows monitoring data from two beds on one farm where we tested that premise with Altacor in 2012. It appears to have worked. Compared to a diazinon spray, the mid-July Altacor ovicide treatment suppressed adult fireworm population all the way up to harvest. We will follow up on this approach to fireworm management next year.

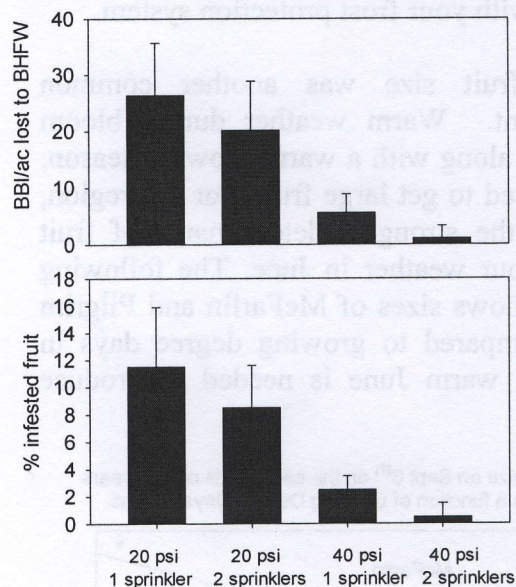
Season long fireworm trap counts on 2 beds within a farm with different insecticide programs



Sprinkler uniformity vs. BHFV control:

If you have been having continued problems with blackheaded fireworm, sprinkler uniformity might be one of the main problems. Below are data we collected this summer.

Variation in fireworm damage within a bed as a function of sprinkler coverage and pressure



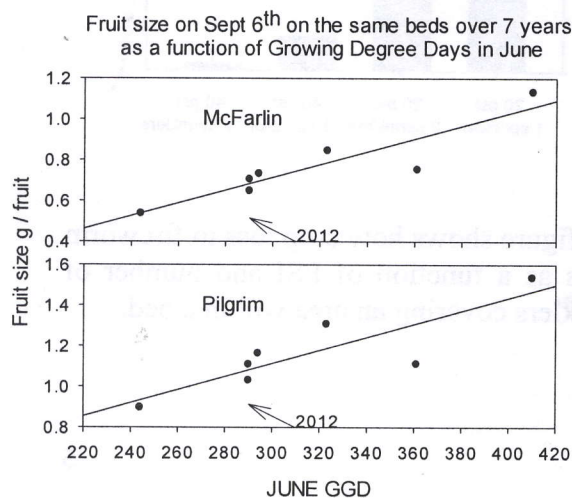
This figure shows how crop loss to fireworm varies as a function of PSI and number of sprinklers covering an area within a bed.

Reflection on 2012 harvest

2012 was another less than remarkable year for yield in the PNW. Every year is another experience in humility in trying to understand the variables affecting our less than exciting harvest and then figuring out if we can remedy it. Here are a few thoughts on how the weather affected our yield:

Growing degree days from February to May have been a good predictor of our mean state yield. This year is no exception. My prediction in June based on those data was for a state average between 80 to 90 bbl/ac. Washington's average was ~84. We also had many nights of low temperatures in May with frost damage hitting several growers hard this year. Severe frost damage is fairly obvious, but subtle frost damage is not. I would wager that, if your beds had well below average yield, frost damage is likely the culprit, even if you think nothing went wrong with your frost protection system.

Small fruit size was another common complaint. Warm weather during bloom and set, along with a warm growing season, is required to get large fruit. For our region, one of the strongest determinants of fruit size is our weather in June. The following figure shows sizes of McFarlin and Pilgrim fruit compared to growing degree days in June. A warm June is needed to produce



large fruit. Our data is also interesting in that it shows that fruit growth rate from the end of August to early October is exactly the same for every variety across every bed. The fruit size you have in mid-August is a good indicator of your final fruit size. The nice warm fall we had in 2012 did little to increase fruit size beyond what it would normally be.

Extensive fireworm damage was noted on some beds. The cold spring delayed and extended hatch and some growers missed their insecticide timings for 1st and 2nd generations of fireworm.

Varieties recommendations for new renovations

After another year of observations I've refined my recommendations. It, of course, depends on your goal: fresh fruit or total tonnage.

Pilgrim: True Pilgrims continue to have excellent production. Good beds should be reaching 250 to 300 bbl/ac fairly consistently, even in off years. They usually do well even in pollination-challenging weather. Our research plots produced > 600 bbl/ac this year, with almost nothing done in regards to management. On some grower beds I've heard complaints that yield may go down over time. We have not seen that to be the case on our variety trials over the past 20 years. They do get leggy over time, and maybe sanding will be helpful. Sites with good drainage are important to bringing them on fast.

The problem, based on the extensive genetic testing we have done, is that there are a lot of off-type or less than pure Pilgrims out there. The differences between Pilgrims of questionable genetic purity and pure Pilgrims can be hundreds of bbl/ac. Do not

consider planting from taking prunings. It is too risky. If you want to be sure of your genetics, DNA testing is available and will cost you \$500 to \$1000 to get enough samples done to be certain of what you are getting. Call me if you are looking for sources of some true Pilgrims.

Stevens: True Stevens vines are good consistent producers with good quality fruit. They tend to be slow to come into production. Unfortunately, few Stevens beds are true to type. As every grower in Washington knows, off-type Stevens (or Pilgrims for that matter) are the bane of our existence, and one of the main reasons for Washington's low average yield. Getting mowed DNA-typed Stevens is a good choice if you can find them; otherwise caveat emptor.

Crimson Queen and Mullica Queen:

Growers with these varieties in Washington are getting excellent crops and seem very pleased with vigor and production. Fruit colors up early and allows for early harvest. Growers in WA report 250 to 400 bbl/ac for Crimson Queen in young beds that have recently filled in. Vines from mowings or rooted cuttings are available. Costs to establish these are high, but I feel confident they will more than make up the differences after just a few years of production. These selections have enough vigor that vines can be mowed after a few years in the field and used to expand with, as long as you pay Rutgers for the acres.

There are a few concerns for fresh fruit production. Both selections can have big fruit, which may not handle too well when dry picked. If they are picked too late (late October), I've seen some quality problems. Crimson Queen can be overly vigorous and this may be a problem on dry-harvest farms that have problems with vine overgrowth on

peaty soils. There are not enough Mullica Queens in production in Oregon or Washington to provide a fair comparison with Crimson Queens.

Scarlet Knight: This was released from Rutgers for fresh fruit production in New Jersey. Our data for Washington shows that it was not as high yielding as Crimson Queen or Mullica Queen, and did not have any lower rots at harvest or after storage. I don't particularly recommend it.

DeMoranville: We have limited grower production data in the PNW for DeMoranville, so I am reluctant to make too strong a recommendation. However, in replicated trials planted in 2009 in Oregon and Washington, it performed as well as other Rutgers' selections. It consistently fills in very quickly with solid uprights and gets very early production. 2012 yields from 2009 plantings of rooted cuttings in Washington and unrooted vines in Oregon averaged 226 and 550 bbl/ac respectively. I have the same concern for fresh fruit as with the other Rutgers' selections, but for total production I think it is a real winner.

Yellow River Stevens: Growers in Oregon like this vine and a few growers in Washington have recently planted it. DNA testing indicates that it is not a Stevens. My only experience with it is in the variety trials in Oregon and Washington. Early results indicate it was nothing special. Early production was considerably less than Pilgrims or Rutgers varieties.

Willapa Red: This variety has consistently held its own against the Rutgers releases in Oregon and Washington trials. The fruit, however, is small, consistently around 1.1 g/berry. Even with small fruit, yields are consistently ~ 300 bbl/ac. It fills in very fast, and produces almost no runners once it

starts fruiting. It does well if drainage is not ideal. It has always had low fruit rot at harvest and after storage.

Because of its smaller size, it might be a good dry harvest fruit if the market is OK with its fruit size. It sets well under less than ideal conditions. Its most unique feature is that of all the plantings I've seen it has the highest upright density of any variety, with most of the uprights having roots all along the lower sections of the upright. Vines are available at no charge in limited amounts from WSU if you want to start a planting from rooted cuttings.

Grygleski 1, 2 & 3: Of the three selections released from Ed Grygleski, #1 has consistently been the most productive in our trials. #1 has been out in the Washington industry for some time and growers have been pretty happy with it. Fresh fruit growers really like its shape and color. Production has been pretty good overall. In comparative trials with Pilgrims or the Rutgers releases in Washington and Oregon, it has had consistently lower yield. Vines from prunings seem to be available. There is no evidence of off-types being a problem from prunings, but no one has bothered to look and yield records from different fields are not extensive enough to provide that data. I would still be cautious starting a planting from prunings.

BG: This is Ed Grygleski's most recent release. We have only had it for a few years in our trials and it is too early to make an inference about its potential. Its early production is less than Rutgers' selections. The fruit are large and well colored.

Hy-Red: No one in Washington has this selection, but grower beds in Oregon and British Columbia look promising. Fruit are small, with high TACY and BRIX. Vines

have been productive with good vigor. It seems fairly comparable to the Rutgers selections, but that is hard to say without side by side comparisons. Royalties are required and vines are available from licensed propagators in WI.

Rutgers' next generation of new releases: There are a few highly promising advanced selections (AKA Rutgers 1, 2 & 3) that have good vigor and fruit quality, fill in fast, and are extremely productive. Dr. Vorsa is looking at a 2014 release of 1 to 3 of these. Only small amounts of vines will be available. These selections yielded between 700 800 bbl/ac in 2012 from the 2009 planting in Oregon.

Below are yields from three sets of replicated trials. Table 1 is the 2009 planting at PCCRF and at Bob Donaldson's in Bandon OR. Table 1 is the 2003 planting at PCCRF. For the 2009 planting in Oregon, the production of Rutgers 1 and 3 is more than noteworthy. Note that for the 2003 planting Pilgrim is the most consistent high producer, with Willapa Red second.

Table 1. 2012 Yield from 2009 planting of cranberry varieties in Long Beach WA and Bandon OR

Variety	bbl/ac	
	Washington	Oregon
Crimson Queen	257	553
DeMoranville	226	559
Grygleski 1	102	254
Mullica Queen	229	551
Pilgrim	224	398
Scarlet Knight	-	304
Stevens	96	216
Willapa Red	235	469
Yellow River	122	188
Rutgers 1	-	725
Rutgers 2	-	568
Rutgers 3	-	733

Table 1. Yield from 2003 planting of cranberry varieties in Long Beach WA

Variety	Yield bbl/ac								
	2005	2006	2007	2008	2009	2010	2011	2012	Total
Crimson Queen	77	179	347	242	293	208	194	295	1835
Mullica Queen	23	20	252	178	206	224	148	487	1538
Scarlet Knight	32	180	253	173	247	268	147	364	1664
Willapa Red	150	217	383	229	376	232	246	327	2160
Pilgrim	257	202	327	345	334	319	291	634	2709
Stevens	1	48	209	138	246	168	160	368	1338

Filling in bare and weak spots. Yield is a function of fruiting upright density per acre. Winter is a good time for growers to shank in these locations with good vines. It is best not to toss off-type vines into a good bed just because they are available. Go with quality vines and do not be shy on the quantity. I have seen the best successes with this where low spots have been filled with new sand and where fresh peat has been added.

WEATHER HISTORY – WSU Long Beach Research and Extension Unit*

Precipitation (inches per month)						Monthly Growing Degree Days (based 45°)				
Month	2009	2010	2011	2012	20 yr. Ave.	2009	2010	2011	2012	20 yr. Ave.
January	9.6	13.2	12.2	12.4	12.1	23	83	28	21	46
February	3.7	8.2	7.8	7.1	7.4	20	56	4	43	38
March	7.7	9.5	10.6	15.6	9.3	10	72	22	29	62
April	4.2	7.9	8.4	9.2	6.4	61	92	29	103	110
May	4.8	3.9	4.8	4.7	3.9	214	180	158	182	235
June	0.7	4.9	1.9	4.1	3.0	361	290	323	290	290
July	0.8	0.9	2.3	1.1	1.3	427	377	414	397	438
August	1.6	1.5	0.4	0.3	1.6	463	411	453	468	454
September	3.3	5.6	3.3	0.5	2.4	401	382	370	350	373
October	8.2	7.8	5.4	12.7	7.6	184	220	205	179	216
November	20.3	13.2	10.4	13.0	12.2	71	85	28	103	84
December	6.2	14.7	4.6			27	35	9		
Totals	71.0	91.4	72.2			2263	2283	2043		