Cornell Cooperative Extension

Eastern NY Commercial Horticulture Program

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Tree Fruit New



2018 Apple Storage Observations and Recommendations Dan Donahue & Mike Basedow, CCE ENYCHP

As we jump into another harvest season, let's review some storage suggestions from Dr. Chris Watkins, and results from our own observations and research in Eastern New York, for some of our major cultivars.

Honeycrisp

Honeycrisp in the Hudson Valley tend to be very prone to bitter pit, while fruit in the Champlain Valley generally do not have as much of a problem with it. In the Champlain Valley there has historically been more concerns with soft scald and soggy breakdown. This historic trend may not always be reliable year to year though, as we saw more bitter pit and very little soft scald in our Champlain Valley survey sites in 2016



Honeycrisp with Bitter Pit

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and 2017. Visiting our survey sites last week, bitter pit symptoms are already beginning to show up in the Champlain Valley, while bitter pit symptoms have been visible in Hudson Valley Honeycrisp blocks for the last three weeks.

Conditioning fruit at 50°F for up to a week will reduce soft scald and soggy breakdown but will likely lead to more bitter pit development. Knowing your block history can help you determine whether you want to condition or not. If a block has historically been very prone to bitter pit, conditioning is not recommended, as this will exacerbate the problem. However, if a block rarely gets bitter pit, and soft scald and soggy breakdown are common, conditioning for seven days would be recommended. Pre-conditioning remains a standard grower practice in the soft-scald prone Champlain Valley. On the other hand, this practice is falling out of favor with storage operators in the Hudson Valley where mitigation of bitter pit in storage is a higher priority.

So where are we in predicting bitter pit in fruit on the tree? Mineral and non-mineral

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predictors of bitter pit are still being investigated. Our colleagues at Penn State suggest bitter pit can be predicted from the average shoot lengths of the trees, and the ratio of nitrogen to calcium in the fruit peel (Baugher et al., 2017). With the differences in growing conditions between Southern Pennsylvania and Eastern NY, it is difficult to determine if these variables are as good of predictors in our region. Results from our 2016 and 2017 survey study have not suggested a relationship between shoot extension and bitter pit incidence in the Eastern New York Region. We are developing a prediction model based on pre-harvest peel mineral analysis along with additional factors that we've identified from our database of 36 Honeycrisp orchard sites in 2016 and 2017. Our work continues in 2018 to determine which orchard conditions may best predict bitter pit in Eastern NY.

Non-mineral tests are also being developed, as mineral tests require peeling fruit and sending them to a mineral analysis lab before bitter pit can be predicted. In the current test, fruit are sampled three weeks prior to commercial harvest, and then left out at 68°F to see if bitter pit symptoms develop (Shoffe et al., 2018). These trials are continuing in the Hudson Valley this season, and are being expanded to Champlain Valley orchards. For 2018, both of our experimental prediction methods, mineral and non-mineral, are predicting a serious bitter pit problem for Honeycrisp held in storage this year, on par with the losses experienced in 2016. Please keep in mind that these prediction methods are still in the developmental phase, and may not be completely reliable.

Honeycrisp is also at risk of CO₂ injury if stored in CA storage. Conditioning and DPA can reduce CO₂ injury. Storing in air for one month prior to CA storage will also reduce injury, but can lead to more bitter pit and fruit greasiness. To combat this problem in the Hudson Valley, consider conditioning for seven days at 50°F, then reduce to 38°F for a month in air, and then store in CA.

NY-1 and NY-2

NY-1 is susceptible to low temperature disorders, and should be stored at 38°F like Honeycrisp. NY-1 is susceptible to CO₂ injury, greasiness, and stem end flesh browning when put into CA storage. 1-MCP can be used to preserve fruit quality if CA storage and cooling are delayed after picking, however, 1-MCP and DPA have a negligible impact on storage disorders if fruit are quickly cooled and placed into CA storage. We have observed the development of rounded, sunken black lesions predominantly on the calyx end of a small number of fruits in the Hudson Valley. These lesions have some characteristics of bitter pit, although they appear to be

centered on lenticels. When held in refrigerated storage until February, these spots are often associated with a yetunidentified rot, which may be a secondary pathogen such as black rot taking advantage of the already decayed tissue. Peel mineral analysis of spotted vs. clean NY-1 apples indicates that spotted fruit has substantially lower concentration of calcium in the peel overall, and relatively lower calcium levels in the calyx vs. the stem end of the apple. These calcium distribution relationships are like those we have observed in Honeycrisp. More study is planned for 2018, and thankfully the incidence of these spots in commercial NY-1 orchards appears to be low, much less of an issue than bitter pit in Honeycrisp.

Storage quality of NY-2 is highly variable, as there were many storage issues of NY-2 in 2015, but very few in 2016. The factors behind this variability remain unclear, but fruit with water core at harvest are more likely to have poor storage quality.

Gala

Stem end flesh browning (SEFB) continues to be a problem in Gala. After experiments conducted in 2015 and 2016, results suggest pre-harvest Harvista and DCA storage can delay, but not control, stem-end flesh browning. Conditioning for seven days at 50°F may also decrease its incidence.

Standard ReTain rates have little effect on SEFB, and 1-MCP also showed no consistent effects in the trial. The current recommendation for Gala remains short term, standard CA (2% oxygen/2% CO2) storage at 33°F.

McIntosh, Cortland, and Red Delicious: CA with 1-MCP or DCA?

Trials conducted in 2016 compared McIntosh, Cortland, and Red Delicious fruit stored in CA and DCA storage in the Hudson and Champlain valleys. Apples were kept at room temperature for 3 or 10 days prior to being stored for eight months in either CA or DCA storage. Half the fruit were also treated with 1-MCP prior to being put into storage. After eight months, fruit were assessed for CO₂ injury and superficial scald.

Champlain Valley results found DCA was the most effective storage treatment for delaying scald of those tested, regardless of if the fruit was treated with 1-MCP. If fruit are going to be in CA storage, 1-MCP will also help reduce the incidence of scald. In addition to differences in the incidence of scald, McIntosh stored in DCA had less CO₂ injury than those in CA. While DCA helped reduce scald and CO₂ injury, it did not preserve firmness on the shelf as well as fruit treated with 1-MCP.

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In the Hudson Valley, all treatments showed complete control of scald compared to air storage. Fruit quality was reduced in McIntosh and Cortland when storage was delayed, but the delay had little effect on Delicious. CO₂ injury of McIntosh was also significantly reduced when stored in DCA without 1-MCP treatment. DCA improved flesh firmness of McIntosh, but flesh firmness was best preserved when DCA fruit were treated with 1-MCP.

Citations

Baugher, T.A., R. Marini, J.R. Schupp, and C.B. Watkins. 2017. Prediction of bitter pit in 'Honeycrisp' apples and best management implications. Hortscience. 52(10):1368-1374.

Shoffe, Y.A., J.F. Nock, and C.B. Watkins. 2018. Nonmineral prediction of bitter pit in 'Honeycrisp' apples. NYFQ. 26(2):21-23.

Supplemental Coverage Option for Apples- Should you add this endorsement to your apple crop insurance policy? Elizabeth Higgins, CCE ENYCHP

Apple growers in New York are starting to see a new crop insurance option in some counties, Supplemental Coverage Option (SCO). I had a couple of questions about it in Ulster County last fall. Now that we are nearing time to sign up for crop insurance again, let's dig in a little deeper – what is SCO and why might you consider it?

supplemental coverage option (SCO) is The an endorsement that you can add to your underlying apple crop insurance policy (APH). It provides additional coverage that is based on an event's regional impacts to yield. Your primary apple policy pays if you suffer an insurable loss on your farm based on your policy coverage and your losses. SCO pays if the regional yield, calculated

as the weighted average of policyholder yields reported to RMA in a region, falls below 86% of the expected regional yield due to an insurable event, regardless of what happens to yields on your farm. Insurable events typically include natural disasters or weather, such as flood or drought or pest infestation, that lead to lower yields or quality even when good management practices are used.

As an example, if a hail storm hits most of the farms in your region, but the damage on your farm was not high enough to trigger an indemnity

payment, you would not receive an insurance payment. BUT if you had purchased the SCO endorsement, and the hail damage in your region resulted in regional yields below 86% of the area expected yield, you would receive an insurance payment, even though you personally did not have an insurance-triggering loss. In a nutshell, as you can see in Table 1, it is possible, with an SCO policy, to suffer an individual loss, but not receive an SCO payment or vice-versa.

So how do you know if SCO makes sense for your farm? In



Figure 1: Counties with SCO available, non-irrigated apples

F		Indemnity Payment Rece	vived
)	Impact to Individual Yield above insured level	Yes APH No SCO	Yes APH Yes SCO
	Impact to Individual Yield below insured level	No APH No SCO	No APH Yes SCO
t		Regional Yield at or above 86% of expected yield	Regional Yield below 86% of expected yield
è			
r	Table 1: Payment Trigge	ers SCO vs APH Apples	

general, the degree to which your yields and yield risk match those S00 of the SCO area is a consideration key continued on next page

Figure 2: SCO coverage, in conjunction with APH coverage



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when deciding whether to purchase an SCO endorsement. The greater the difference between your farm's yield volatility and the SCO area's yield volatility, the less likely an SCO payment will be triggered when you experience a yield loss. The size or homogeneity of the region could also have an impact. A smaller, region is more likely to have an event that would result in a regional yield or revenue impact than a very large region. The size of the SCO region can vary from single county to multi county. For example, Ulster County, NY's region for fresh market, irrigated apples is just Ulster County but Washington County NY's region is 18 counties in New York, Massachusetts and Vermont.

How much does SCO coverage cost? If you have purchased less underlying insurance coverage, the SCO coverage would cost more but provide more protection. If you have purchased more coverage then the SCO coverage costs less but provides less additional protection. Figure 2 shows how the two programs work together. Also, like APH insurance, SCO coverage is subsidized by the federal government, so farmers only pay 35% of the actuarial cost of the coverage.

Let's look at some scenarios that show how adding the SCO endorsement could impact a grower in 2 regions in Eastern New York, Ulster and Washington Counties (assume the farms have the same historic yields):

2018 Washington Irrigated Fresh Market Apples, 100 acres

- Approved Yield 658 bu/ac ٠
- Price \$13.30/bu
- Expected Area Yield 785.4 includes 18 counties in • NY, MA and VT. 86% threshold is 675.4 bu/ac

Scenario 1: A very significant and widespread frost event results in a 51% reduction in yield on the farm, so all levels of APH insurance pay. The regional average yield after this event also declines by 51%. In this example, where the regional yields also had the same level of

							-
APH Coverage Level Percent	75%	70%	65%	60%	55%	50%	yield, you can see that
Additional SCO coverage Percent	11%	16%	21%	26%	31%	36%	having higher SCO coverage and lower APH
APH Policy, Producer Premi- um	\$41,315	\$30,442	\$24,255	\$17,673	\$14,435	\$10,602	coverage provided a higher payment.
APH Yield Guarantee bu/ac	493.5	460.6	427.7	394.8	361.9	329	Sconario 2: A loss
SCO Endorsement, Producer Premium	\$6,998	\$8,694	\$9,745	\$10,432	\$10,824	\$11,303	significant frost results
SCO Regional Yield Guarantee (86%) bu/ac	661.4	661.4	661.4	661.4	661.4	661.4	in a 20% reduction in yield on your farm <u>and</u>
Total Premium	\$48,313	\$39,136	\$34,000	\$28,105	\$25,259	\$21,905	regionally. You do not have enough of a loss to

APH Coverage

Level Percent

Additional

SCO Coverage

Percent

APH Policy,

Producer

Premium

APH Yield

Guarantee

bu/ac

SCO

Endorsement.

Producer

Premium

SCO Regional

Yield Guarantee (86%) bu/ac

Total

Premium

75%

11%

\$52,101

493.5

\$7.776

2018 Ulster Irrigated Fresh Market Apples, 100 acres

- Approved Yield: 658 bu/ac
- Projected price \$13.30/bu
- Expected Area Yield 769.1 for SCO region only includes Ulster County. 86% threshold is 661.4 bu/ac

receive APH payments at any level of coverage, but you do receive a benefit from SCO for the difference between 86% and 80% yields. In this example, where there is widespread damage, but the level of damage on the individual farm is not high enough to result in a crop

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decline as the farm

\$59,877	\$55,910	\$42,004	\$34,644	\$31,214	\$26,744
675.4	675.4	675.4	675.4	675.4	675.4

65%

21%

\$30,786

427.7

\$11.218

60%

26%

\$22,507

394.8

\$12.137

55%

31%

\$18,481

361.9

\$12.733

70%

16%

\$46,060

460.6

\$9.850

50%

36%

\$13,666

329

\$13.078

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insurance payment, the SCO endorsement resulted in indemnities but not APH at any level.

Due to the higher coverage level than APH, SCO may help you increase the number of scenarios under which you would be likely to receive a benefit.

		1				Indemnity Payment at Level of APH Coverage							
		App.	Act.										
	Acres	Yield	Yield	Price	Exp. Return	75%	70%	65%	60%	55%	50%		
Ulster APH	100	658	322.4	\$13.30	\$ 875,140	\$227,536	\$183,779	\$140,022	\$ 96,265	\$ 52,508	\$ 8,751		
Washington APH	100	658	322.4	\$13.30	\$ 875,140	\$227,536	\$183,779	\$140,022	\$ 96,265	\$ 52,508	\$ 8,751		
Ulster SCO	100	769.1	376.9	\$13.30	\$ 1,022,903	\$112,519	\$163,664	\$214,810	\$265,955	\$317,100	\$368,245		
Washington SCO	ashington SCO 100 785.4 384.8 \$13.30 \$1,044,582		\$ 1,044,582	\$114,904	\$167,133	\$219,362	\$271,591	\$323,820	\$376,050				
Ulster Pa	nity - Pr	emium P	aid)	\$291,743	\$308,308	\$320,832	\$334,115	\$344,349	\$355,091				
Washingtor	n Payou	ıt (Inde	mnity	- Premiur	n Paid)	\$282,563	\$302,553	\$317,381	\$333,213	\$345,115	\$358,057		

Table 1: Scenario 1, widespread damage

Table 2: Scenario 2, widespread minor damage

						Indemnity Payment at Level of APH Coverage							
		App.	Act.										
	Acres	Yield	Yield	Price	Exp. Return	75%	70%	65%	60%	55%	50%		
Ulster APH	100	658	526.4	\$13.30	\$ 875,140	\$-	\$-	\$-	\$-	\$-	\$-		
Washington APH	100	658	526.4	\$13.30	\$ 875,140	\$-	\$-	\$-	\$-	\$-	\$-		
Ulster SCO	100	769.1	615.3	\$13.30	\$ 1,022,903	\$ 61,374	\$ 61,374	\$ 61,374	\$ 61,374	\$ 61,374	\$ 61,374		
Washington SCO	Washington SCO 100 785.4 628.3 \$13.30 \$1,044,582		\$ 62,675	\$ 62,675	\$ 62,675	\$ 62,675	\$ 62,675	\$ 62,675					
Ulster Pa	nity - Pr	emium P	aid)	\$13,061	\$22,238	\$27,374	\$33,269	\$36,115	\$39,469				
Washington	Payou	t (Inde	mnity	- Premiur	n Paid)	\$2,798	\$14,315	\$20,671	\$28,031	\$31,461	\$35,931		

Scenario 3: A hailstorm affects your farm, resulting in a 35% reduction in yield. The level of damage regionally was not enough to cause regional yields to fall below 86% of expected yield, so there is no SCO payment. In this example, you can see that for more localized events, indemnities are more likely to be triggered at higher levels of APH coverage. These types of events are also what may make SCO endorsements less likely to pay out in counties where the region is very large.

- Using SCO with lower levels of APH may decrease your premium, but in exchange you are less likely to receive an indemnity for insurable events that occur on your farm but not in your region.
- A key consideration is whether you have enough coverage to get your business back on its feet after an insurable event, at an annual cost that is affordable to your business.

						Indemnity Payment at Level of APH Coverage							
		App.	Act.										
	Acres	Yield	Yield	Price	Exp. Return	75%	70%	65%	60%	55%	50%		
Ulster APH	100	658	427.7	\$13.30	\$ 875,140	\$ 87,514	\$ 43,757	\$-	\$-	\$-	\$-		
Washington APH	100	658	427.7	\$13.30	\$ 875,140	\$ 87,514	\$ 43,757	\$-	\$-	\$-	\$-		
Ulster SCO	100	769.1	769.1	\$13.30	\$ 1,022,903	\$-	\$-	\$-	\$-	\$-	\$-		
Washington SCO 100 785.4 785.4 \$13.30 \$1,044,582		\$-	\$-	\$-	\$-	\$-	\$-						
Ulster Pa	yout (I	ndemn	ity - Pr	emium P	aid)	\$39,201	\$4,621	(\$34,000)	(\$28,105)	(\$25,259)	(\$21,905)		
Washington	Payou	ıt (Inde	mnity ·	- Premiur	n Paid)	\$27,637	(\$4,603)	(\$42,004)	(\$34,644)	(\$31,214)	(\$26,744)		

Table 3: Scenario 3, localized damage

So, should you consider adding the SCO endorsement? Like any farm management decision, it depends.

 SCO would provide more protection for your farm business if insurable events that are likely to impact your farm are as likely or are more likely to also affect other producers in your region.
TREEFRUIT NEWS Cornell University delivers crop insurance education in New York State in partnership with the USDA, Risk Management Agency. This material is funded in partnership by USDA, Risk Management Agency, under award number RM17RMETS524020

Upcoming Events

Grow a Successful Agritourism Business! Assessing and Managing Your Financial Risk from Agritourism

Bringing visitors to your farm can create new income streams but agritourism can also be a source of risk to your farm business. Five lunchtime seminars will teach how to assess and manage different risks to help develop a successful agritourism business. The seminars will be followed by a panel of successful agritourism operators. In-between each seminar, participants will build on their knowledge to develop their own risk management plan.

This 5-county program will be offered simultaneously in Delaware (the host county), and by Zoom technology in Otsego/Schoharie, Sullivan and Ulster Counties. The Ulster County site, hosted by Liz Higgins of the Eastern NY Commercial Hort Team, will be at the Hudson Valley Lab **Date/Time Topic**

The sessions run from 10-2:30 with a 1/2 hour for lunch

•Friday 9/28 Introduction to Risk Management; Assessing and Managing Your Financial Risk from Agritourism

•Friday 10/5 Assessing and Managing Your Production/Weather Risk From Agritourism

•Friday 10/12 Assessing and Managing Your Legal Risk From Agritourism

•Friday 10/19 Assessing and Managing Your Marketing Risk From Agritourism

•Friday 10/26 Assessing and Managing Your Human Resource Risk From Agritourism

Friday 11/2 Agritourism Farmer Panel

There is no fee to attend, feel free to bring your own lunch. Snacks and beverages will be provided. Please RSVP so that we can have ensure that we have adequate room and resources.

Registration and more info at: https://enych.cce.cornell.edu/event.php?id=990



Tree Fruit Specialists

Dan Donahue Phone: 518-691-7117 Email: djd13@cornell.edu

Mike Basedow Phone: 518-410-6823 Email: mrb524@cornell.edu

Business Specialist

Liz Higgins Cell:518-949-3722 Email:emh56@cornell.edu

ENYCHP Office

Abby Henderson Phone: 518-746-2553 Email: aef225@cornell.edu Open: Mon, Wed, Fri 8:00am-4:00pm

Editor: Mike Basedow

www.enych.cce.cornell.edu



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