



A partnership between Cornell University and the CCE Associations in these five counties: Monroe, Niagara, Orleans, Oswego & Wayne

Fruit Notes

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Cornell Cooperative Extension
Lake Ontario Fruit Program

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Announcing Peel SAP Analysis for Early Prediction of Bitter Pit in ‘Honeycrisp’

Terence Robinson, Lailiang Cheng, Chris Watkins, Mario Miranda Sazo, Craig Kahlke and Michael Basedow

In early July we will begin a cooperative effort between CCE, growers, consultants, and storage operators to collect Honeycrisp fruitlets statewide to analyze them for mineral nutrient concentrations. This is part of a statewide extension effort funded by ARDP to evaluate Honeycrisp orchards throughout the state for determination of fruit storage potential and the risk of bitter pit in storage.

For the last several years we have evaluated peel SAP analysis to better predict bitter pit early in the growing season to allow better decisions on mitigation efforts during the rest of the season and storage potential. Peel SAP analysis was developed over the last 4 years, with the support from NY Apple Research and Development Program. In 2020 we evaluated 265 blocks in Western NY and this year are extending the project to growers anywhere in the state of NY.

We would like to encourage all Honeycrisp growers to start thinking about which Honeycrisp blocks (or ideally all blocks at your farm) you would like to collect fruit for peel SAP analysis this July 2021. We are specially inviting all packinghouses and their Honeycrisp fruit growers to submit peel samples to CCE this season.

If you participate, you need to complete and submit a form in 1 of 2 ways. To submit electronically, you will need to fill out the electronic version of the form that must be opened from **the attached fillable pdf, completed with Adobe, & submitted using the “submit form” button**, to submit it correctly (this results in the information being automatically emailed back to LOF upon successful submission of data). Otherwise, a printable pdf version is available on the website https://rvpadmin.cce.cornell.edu/pdf/event_new/pdf72.pdf. If you use the printable form, please fill it out and scan and email to emt44@cornell.edu or mail to CCE with a check Attn to Kim Hazel, Orleans County CCE, 12690 State Rte 31, Albion, NY 14411. You will then, at the announced date in July (probably early July in the Hudson Valley and early to Mid-July in WNY and the Champlain Valley), collect a 30-fruit sample from each of your Honeycrisp blocks, weight the sample to get the average fruit weight in grams (see note below), peel the fruits, freeze the peel sample, and then contact your local fruit extension specialist for submitting the sample. We will then analyze the peel sap for nutrient concentrations and send you a report on nutrient ratios and recommendations for mitigation actions and storage recommendations by late July. We believe that this new and early predictive tool will allow for more effective management of Honeycrisp fruit nutrition to reduce bitter pit incidence.

There will be a minimal fee of \$5 for each sample submitted, but most of the analysis cost will be covered by the ARDP grant we were awarded.

Specific instructions on how to collect the fruit sample will be sent to participating growers a few days in advance of the collection date. However, to facilitate the collection of samples, we ask that you now complete and submit the form using the instructions above. After the samples are collected a member of CCE team will pick up your frozen sample(s) and will transport them for peel SAP analysis at Cornell Nutrient Analysis Lab in Ithaca.

We hope all Honeycrisp growers in cooperation with their packing and marketing companies, will submit a sample from each Honeycrisp block in NY for peel SAP analysis via CCE this season!



Note: It is very important that growers weigh their 30-fruit sample **BEFORE** peeling the fruits this year. This new data will be used to correct and standardize the nutrient ratios by factoring in the effect of fruit size at sampling in July. We encourage all growers to use their digital kitchen balances (if working properly) or buy a cheap balance on Amazon at \$17.99. Please check the following website:

https://www.amazon.com/GDEALER-Digital-Kitchen-0-001oz-Stainless/dp/B08YW3NCJT/?_encoding=UTF8&mid=A2QMH4UKDFN4Y&pf_rd_p=5d280014-ec5b-42f3-a3b6-117903cdd60e&pd_rd_wg=y45KJ&pf_rd_r=WWRPVEQWHE4F70SE2ASE&pd_rd_w=UIEK1&pd_rd_r=02da2642-9199-46bb-87d1-2c7db1ba9267&ref_=pd_gw_deals&th=1

European Cherry Fruit Fly update

Janet van Zoeren (CCE-LOF), Juliet Carroll (NYSIPM), and Margaret Kelly (NYSIDAM)

If you grow cherries in the region, it is likely you have already been approached by someone from New York State Department of Agriculture & Markets (NYSIDAM) asking you to sign a compliance agreement regarding European cherry fruit fly (ECFF; *Rhagoletis cerasi*) management. Here we provide more context about the pest itself, and hopefully explain the quarantine regulations in an easy-to-understand manner. However, if you have any questions at all about ECFF or cherry pest management in general, please be in touch with Janet van Zoeren (LOF, 585 797 8368, jev67@cornell.edu) or specific to ECFF requirements contact Patty Sierzenga (NYSIDAM, patricia.sierzenga@agriculture.ny.gov).

European Cherry Fruit Fly - ECFF fact sheet:
<https://ecommons.cornell.edu/bitstream/handle/1813/53834.3/eur-cherry-fruit-fly-FS-NYSIPM.pdf?sequence=6&isAllowed=y>

Cherry Fruit Flies factsheet:
<https://ecommons.cornell.edu/bitstream/handle/1813/43083.2/cherry-fruit-flies-FS-NYSIPM.pdf?sequence=6&isAllowed=y>
is a quarantine pest of sweet and tart cherries. It was first found in NY in 2017 in Niagara County. Now, by 2021, it has also been trapped in Orleans, Erie, and Monroe counties. **The predominant impact of this pest on the cherry industry is from market and export regulations.** Although, if left uncontrolled,

ECFF can infest up to 100% of cherries in an orchard, it is likely that in commercial orchards the insecticide programs for plum curculio, our native cherry fruit flies and spotted wing drosophila would protect fruit from ECFF. Small-scale or reduced spray orchards may not be allowed to sell fresh cherries outside the quarantine zone, unless they follow the specific guidelines outlined below.



Adult European Cherry Fruit Fly. Note distinctive yellow scutellum.

Quarantine Area is now all of Niagara, Orleans, Erie, Monroe and Wayne Counties, as well as the NW corner of Ontario Co. Growers within these counties will be asked to enter into a compliance agreement, which specifies (a) how orchards will be monitored for ECFF, (b) the program-approved insecticides that need to be applied, (c) the timeframe for when the insecticides need to be applied, and (d) any regulations and restrictions on shipping

cherries for fresh or processing markets (described below).

Fresh cherries sold within the quarantine zone. For growers selling all of their fruit entirely within the quarantine zone, there will be no additional regulations in 2021. This includes roadside stands and U-Pick operations. Please ensure that customers do not intend to then remove the fresh cherries from the region.

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‘Systems Approach’ for all cherries leaving the quarantine zone.

Insecticides. Cherries must stay covered from 30 days prior to harvest through until harvest, using the products listed in Table 1 at right. These must be applied at label rate and re-covered every 6-10 days. A ECFE insecticide quick guide additionally provides information on the efficacy of these products against SWD – we highly recommend you use products which will control both! Remember to save low PHI products to rotate in at the end of the season.

ECFF Trapping. NYSDAM will set and monitor traps in all cherry blocks across the quarantine zone. Cherry growers will not need to do any trapping for ECFE. When growers sign the compliance agreement with NYSDAM, arrangements are made for their staff to set traps. At most one capture of an adult ECFE in the orchard will be allowed, for fruit to be sold as fresh outside the quarantine zone. If ECFE was trapped in your orchard in 2020, you will still start this growing season with a record of zero detects.

Limited Fruit Distribution. The number of restricted counties in New York has been reduced compared with previous years. Cherries from the quarantine area may not move to the New York counties of Columbia and Ulster nor the states of California, Idaho, Montana, Oregon, Utah and Washington. Cherries shipped to Michigan may not be sold as fresh, they must go to processing.

Specific guidelines for processing cherries.

Table 1. Approved Pesticides for Systems Approach – labeled generic equivalents may be used. Note, Sevin 4F registration has been discontinued.

IR AC	Trade name	Rate	Chemical name
1A	Sevin 4F	2-3 qt/acre	carbaryl
1A	Sevin 80 Solupak	2.5-3.75 lb/acre	carbaryl
1A	Sevin XLR Plus	2-3 qt/acre	carbaryl
1B	Imidan 70W	2.13 lb/acre, or 0.75 lb/100 gal	phosmet (not on sweet cherry)
3A	Asana XL 0.66EC	4.8-14.5 fl oz/acre, or 2-5.8 fl oz/100 gal	esfenvalerate
3A	Baythroid XL 1EC	2.4-2.8 fl oz/acre	cyfluthrin
3A	Warrior II 2.08CS	1.28-2.56 fl oz/acre	lambda-cyhalothrin
3A	Mustang MAXX	1.28-4.0 fl oz/acre	zeta-cypermethrin
4A	Assail 30SG	5.3-8 oz/acre	acetamiprid
4A	Assail 70WP	2.3-3.4 oz/acre	acetamiprid
5	Delegate 25WG	4.5-7 oz/acre	spinetoram
5	Entrust 2SC	4-8 fl oz/acre, or 1.3-2.7 fl oz/100 gal	spinosad
5	Entrust 80WP	1.25-2.5 oz/acre, or 0.42-0.83 oz/100 gal	spinosad
5	GF-120NF	10-20 fl oz/acre	spinosad & bait
28	Exirel	10-17 fl oz/acre	cyantraniliprole

Cherries sold for processing outside the quarantine area need to come from a block with no more than one fly trap catch or be inspected for larvae using an intensive float test. Growers who will sell cherries for processing could relax the insecticide guideline above, only if they conduct a float test of their cherries (with zero larvae found in the test), and only send them for processing. In addition, cherries sold for processing in Pennsylvania or

Michigan are required to undergo a float test prior to leaving the quarantine, regardless of trap catches. Float tests are conducted by packers/buyers/wholesalers. Sometimes growers may conduct float tests if they have signed a compliance agreement indicating they know whether a standard or intensive float test is required. Float tests must be documented on a form approved by NYSDAM.

Cherries that fail either the standard or intensive float test may still be moved to Pennsylvania for processing provided the processing facility safeguards disposal of the culls. Check with your broker/buyer/wholesaler that the processor is able to safeguard culls, if necessary. Cherries moved to Michigan for processing must be utilizing the systems approach, must have passed an intensive float test, and the processor must be able to safeguard culls. Protocols for float tests are provided when signing compliance agreements with NYSDAM. There is the standard float test and the intensive float test.

Additional guideline for fresh cherries to be sold outside the quarantine zone. Growers who intend to sell fresh cherries outside the quarantine zone **must** label all containers with “Limited Permit: USDA-APHIS-PPQ, not for distribution in California; Idaho; Montana; Oregon; Utah; Washington; and the counties of Columbia and Ulster in New York.,” and

“Not for distribution to Michigan as fresh cherries”. This is on top of following the systems approach outlined above.

Selling your cherries. NYSDAM is working with cherry growers, processors, and wholesalers to get New York cherries to market. NYSDAM will assist producers and sellers at all levels to achieve compliance with the ECFF regulations. By working together – NYSDAM and cherry producers and sellers – out-of-state markets will be kept open. NYSDAM has worked with USDA to keep open the interstate sales of cherries from the quarantine area without risking the spread of ECFF. Procedures for getting fruit to out-of-state processing facilities have been modified to keep this market open, specifically with Pennsylvania and Michigan. There are limitations on cherries leaving the quarantine area, but these can be addressed by participating in the Systems Approach. Growers, sellers and wholesalers who are unsure where their harvest fits should contact Patty Sierzenga (NYSDAM) at 585-370-1606 or patricia.sierzenga@agriculture.ny.gov.

The flies are flying. ECFF adult flies have been caught in traps in untreated areas in Niagara County outside orchards. Adult flies emerge from the soil and there is only one generation per year. These are most likely from fruit infestations on the alternate host, honeysuckle (*Lonicera*) that is commonly found in hedgerows.

Varietal Resistance to Apple Scab (*Venturia inaequalis*)

Ian Mellon and Awais Khan (Plant Pathology and Plant-Microbe Biology, Cornell University, Geneva) and Janet Van Zoeren (CCE-LOF)

Apple scab, caused by *Venturia inaequalis*, is the most significant fungal disease impacting apple growers, and without careful management it can devastate the cosmetic appearance of fruits resulting in huge economic losses. Traditionally, apple scab has been controlled using frequent fungicide applications, but the rise in pathogen strains resistant to common fungicides require durable approaches based on host genetic resistance and apple breeding.

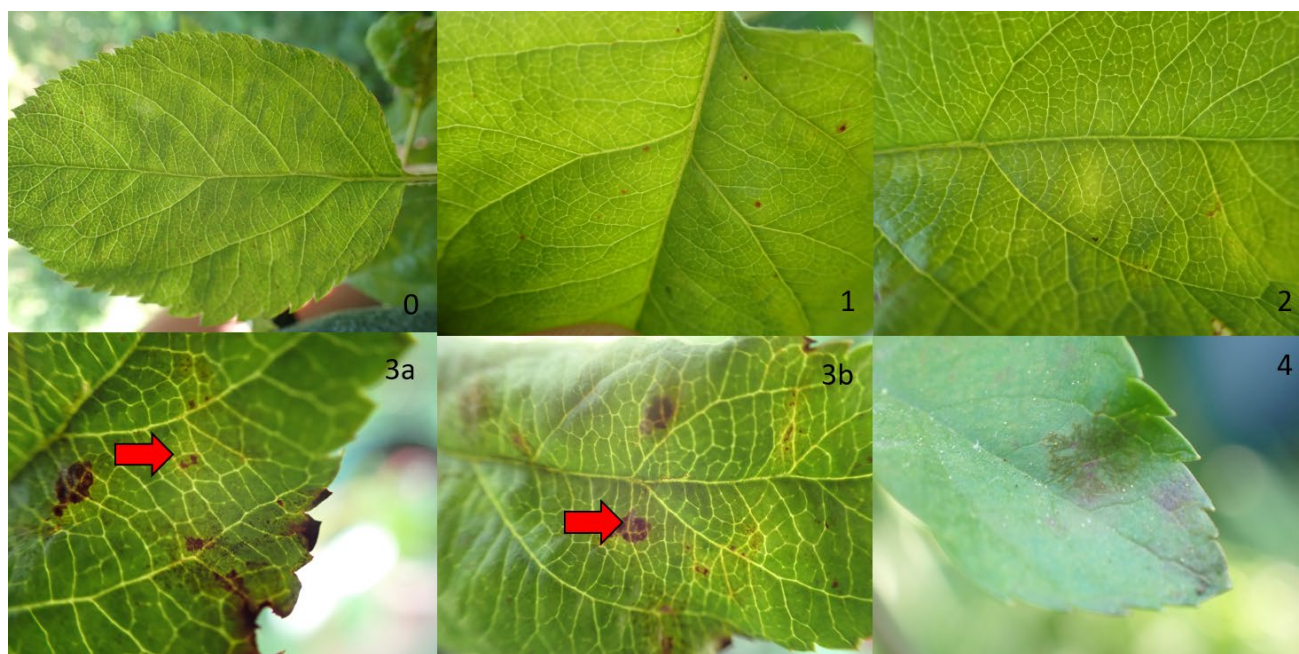
Qualitative vs Quantitative Resistance

Plant genetic resistance to disease can be broadly divided into two categories: qualitative and quantitative. Qualitative or major resistance is the primary focus in apple breeding and provides single gene control for the disease at the cost of a high selection pressure for pathogens. This high selection pressure can rapidly drive the evolution of pathogen

populations that can overcome the specific major resistance. Quantitative resistance provides a range of minor to moderate susceptibility-resistance responses, but at a much lower selection pressure. These quantitative trait loci fit within the IPM approach of keeping disease pressure below an economic threshold.

Qualitative resistance relies on gene-for-gene relationships between host and pathogen. In the *Malus-Venturia* pathosystem, *V. inaequalis* secretes effector proteins produced by avirulence genes (Avr) that assist in infection,

while the host has resistance genes (R) that produce proteins, which recognize the specific effector and activate Effector Triggered Immunity (ETI). The ETI response in apples can have multiple symptoms depending on the R genes involved, ranging from a pinpoint hypersensitive response, up to chlorosis and weak sporulation. The activation of ETI depends on the Avr-R gene recognition, and pathogen mutations can result in isolated populations that avoid this resistance. These populations are referred to as pathogen races, and resistant cultivars list the races they protect against.



Apple Scab Incidence Scale: 0 – Healthy plant or escape from disease, 1 – hypersensitive response shown by pinhole necrosis, 2 – chlorosis, 3a – weakly sporulating lesions, 3b – more strongly sporulating lesions, 4 – full susceptibility

Future of Breeding for Apple Scab Resistance

The best-known host resistance to apple scab is *Rvi6*, also known as 'Vf', which was originally identified in the Japanese crabapple *Malus floribunda* '821'. The *Rvi6* based resistance response is usually chlorosis up to weak sporulation and can be found in many resistant cultivars including 'Enterprise', 'Florina',

'Prima', 'Liberty' and 'Nova Easygro'. Other apple scab resistance genes include *Rvi5* in *M. micromalus* and *Rvi8* from the wild progenitor of domesticated apples *M. sieversii*. Popular cultivar 'Honeycrisp' has two potential novel resistance genes in, and a collaboration between our team at Cornell University and the University of Minnesota is working to fine

map apple scab resistance from Honeycrisp for use in apple breeding.

While *Rvi6* has had a major role in apple breeding programs, the rise in scab fungal populations that can overcome *Rvi6* resistance will continue directing breeding programs to utilize different resistance genes. In January 2020, *Rvi6*-overcoming apple scab was identified on a variety of hosts including *M. floribunda* '821', 'Prima', and 'Nova Easygro' in research orchards in Geneva, NY. Scab fungal populations that can overcome *Rvi6* can now be found in other states as well as Europe and New Zealand. Some common cultivars containing *Rvi6*, like 'Liberty', have yet to have total resistance breakdown, although it is only a matter of time due to the overreliance on a single gene.

Moving forward, breeding programs will be looking to utilize multiple resistance sources in developing new cultivars, called gene pyramiding. This will help prevent single mutations from evading ETI recognition and help extend the life of the cultivar.

Additionally, incorporating quantitative host resistance in future cultivars can reduce the severity of scab pressure in IPM production systems, leading to durable and sustainable apple scab management.

More information on the disease susceptibility of a wide selection of cultivars can be found on the Database of Apple Diseases at:

<https://blogs.cornell.edu/applevarietydatabas/e/disease-susceptibility-of-common-apples/>

Hard Cider Research & Education Needs Assessment

Dear Cider Industry Member,

The New York Farm Viability Institute, New York Cider Association, and Cornell University have teamed up to conduct a research and outreach needs assessment of the New York hard cider sector and we need your input! Please take a few minutes and share your thoughts about the greatest needs in your operation and the industry overall. The general topics include fruit production, cider production, and marketing and economics. The information we collect will all be anonymous and used to inform grant funding, research projects, workshop topics, and policy agendas.

The survey is attached as a PDF, or you can access the survey at:

https://corexms6ch5fq3hh4pt3.sjc1.qualtrics.com/jfe/form/SV_0cU2eo5mbHtPalM

or



On behalf of the New York Farm Viability Institute, New York Cider Association, and Cornell University, thank you for your time and input.

Sincerely,

Dave Grusenmeyer
NY Farm Viability Institute

Greg Peck
Cornell University

Scott Ramsey
NY Cider Association

Please Fill Out “Rodent Management” Survey

The New York State IPM Program helps people manage pests in ways that minimize environmental, health and economic risks. In addition to expertise in agricultural commodities, our program provides education about 'structural pests,' including rodents. The purpose of this nine question survey is to collect information about current rodent

management practices around farms to identify opportunities for outreach.

Survey Link:

https://cornell.ca1.qualtrics.com/jfe/form/SV_a5HcSjws6ref59Y

Thank you for your time!

Orleans Youth Producers Food Hub

Robert Batt, Executive Director, Orleans County CCE

Have youth ages 5-18 that help grow on the farm? Orleans CCE has a grant through the GVRMA and Ralph Wilson Foundation to reimburse youth for up to \$500 in donations to food pantries. Youth complete a one-page application, one page record form, and submit a receipt form when they have made donations. If you have some interested kids

on the farm, we would love for them to participate. The forms can be found here:
<http://orleans.cce.cornell.edu/4-h-youth-development/4-h-forms-files>

If you have questions, you can call Robert Batt at 585-798-4265 or email rpb23@cornell.edu

Mark Your Calendars

Honeycrisp Meetup Continues – Thursday, July 1, 7-8 PM (4-5 Pacific Coast Time)

Virtual Honeycrisp Meetup - A three-part series of conversations about Honeycrisp

Researchers, extension specialists and grower panelists;
New York grower Rod Farrow; Michigan grower Chris Kropf and Washington grower Bruce Allen
Join us and bring your experience and questions!
Register to each date in the links below.

JULY 1ST

NUTRIENT MANAGEMENT

Register here: https://wsu.zoom.us/webinar/register/WN_PEUvC-sZRHmkeTI7YHgA8Q

Facilitated by **B. Sallato** WSU Extension, **M. Miranda Sazo** Cornell Cooperative Extension, and **A. Wallis** MSU Extension. Supported by IFTA, USDA-SCRI Root2Fruit project and Good Fruit Grower. For more information visit <http://treefruit.wsu.edu/event/virtual-honeycrisp-meetup/2021-06-03/>

LOF Summer Tour – Featuring Wayne County

Thursday, August 12th. Cutting edge farms and research. Lunch provided. Stay tuned. See article on page 1 of the previous issue on new COVID guidelines.

Cornell Cooperative Extension
Lake Ontario Fruit Program
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Fruit Notes

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Fruit Specialists



Craig Kahlke | 585-735-5448 | cjk37@cornell.edu
Team Leader, Fruit Quality Management

Areas of Interest: Fruit Quality and factors that affect fruit quality before, during, and after storage,
Crops: Blueberries, Raspberries / Blackberries, Strawberries, Apples, Apricots, Cherries, Nectarines, Peaches, Pears, Plums



Mario Miranda Sazo | 315-719-1318 | mrm67@cornell.edu
Cultural Practices

Crops: Blueberries, Raspberries / Blackberries, Strawberries, Apples, Apricots, Asian Pears, Cherries, Currants, Gooseberries, Nectarines, Peaches, Pears, Plums



Janet van Zoeren | 585-797-8368 | jev67@cornell.edu
Integrated Pest Management (IPM)

Areas of Interest: IPM of tree fruit and berry pests, biological control, and pollinators.
Crops: Blueberries, Raspberries / Blackberries, Strawberries, Apples, Apricots, Asian Pears, Cherries, Currants, Nectarines, Peaches, Pears, Plum



Mark Wiltberger | 315-272-8530 | mw883@cornell.edu
Business Management

Crops: Apples, Cherries, Nectarines, Peaches, Pears, Plums

For more information about our program visit us at lof.cce.cornell.edu