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

Fruit Notes

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Cornell Cooperative Extension
Lake Ontario Fruit Program

Volume 21 Issue 7 May 12, 2021

Precision Chemical Thinning in 2021 for Gala and Honeycrisp

Terence Robinson, Mike Basedow, Mario Miranda Sazo, and Craig Kahlke

2021 Fruit Growth Rate Model Protocol

1 - Select a mature orchard of either Gala or Honeycrisp (or any other cultivar).

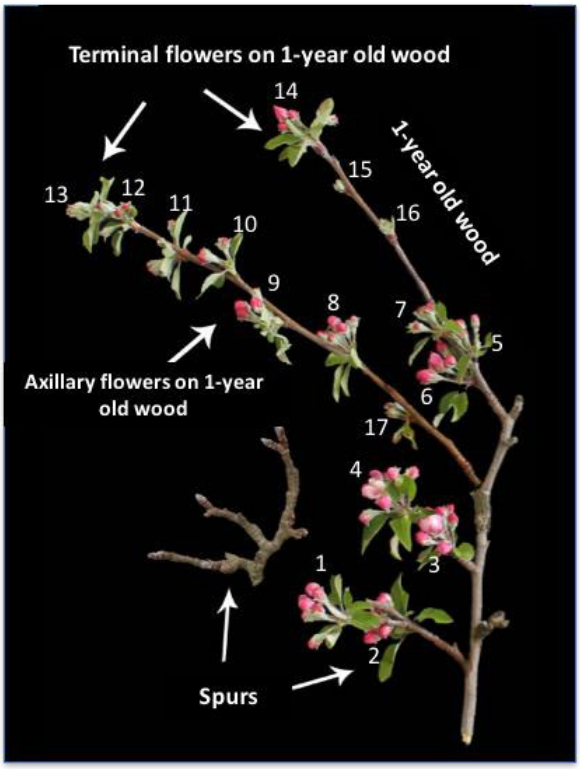
2 – Set up a Malusim account. To set up your https://malusim.org/ account, you will need to create a username and a password to log in. You will then create a block by selecting "add a location". You will then need to enter in all the info required for the fruit growth rate model, which includes:

- Year
- Farm
- Variety

3 - From pink to petal fall, mark and tag 5 representative trees (Tree#1 - Tree#2 - Tree#3 - Tree#4 - Tree#5) and count the flower clusters on each tree (the earlier you count the better to see the clusters. **Count all flower clusters except the axillary flower buds on one year old wood (see the photo below).** You will then enter these cluster counts at https://malusim.org once you've set up your account.

4 - Calculate target crop load for a high yield = desired number of fruit per tree.

5 - Click on the block name on https://malusim.org/ and select the fruit growth rate model. From there,you can then enter in your tree cluster counts, and your target fruit number per tree.



6 - Tag 15 spurs (flower clusters) per tree on each of 5 representative trees (75 total spurs) (preferable at pink, otherwise at bloom). **Make sure you do not mark clusters on terminal or axillary buds on 1-year wood.** Try to choose the 15 clusters according to the cluster distribution on the tree. For instance, if you have more flower clusters on the top part, mark more clusters there and so on.

7 – There is no need to number the individual fruitlets in each cluster, however each fruitlet has to be measured. Be careful when taking the measurements not to measure twice the same fruitlet within the cluster. Each cluster has to be numbered (1 to 15) and the measurements (fruit diameter) from that cluster have to be correspondent to that cluster. We recommend you buy an electronic caliper with a digital read-out in millimeters to take the measurements. Lowes sells them for about $15.

8 - Apply one of two spray protocols of thinning sprays from Terence's recommendation list (seebelow) or follow your own thinning program.

9 - Use the carbohydrate model to adjust rates up or down based on model recommendations andthe amount of thinning to be done (http://newa.cornell.edu/index.php?page=apple-thin-new)

IF you decide not to apply a bloom and/or a petal fall thinning spray you still can follow the protocol and measure the fruitlets, however it is optional to you. In this case, the model will tellyou the potential number of fruit per tree and how much thinning needs to be done at the later stages.

10 – **VERY IMPORTANT THIS YEAR:** Measure fruit diameters at **50DD Base 4°C** following the petal fall spray, and again at **120DD Base 4°C**. Repeat measurements at the same degree day intervals following the 10- 12mm spray and following the 15-18mm spray if you end up putting them on. The number of times to measure will depend on when you reach your target number. You can view your degreeday accumulations from the Carbohydrate Thinning Model (http://newa.cornell.edu/index.php?page=apple-thin-new) to help determine your timings for these measurements.

11 – Enter the data and all the information needed into your https://malusim.org/account for each block.This can be done by clicking the bock name, then clicking into the Fruit Growth Rate Model, andthen clicking the green "+" sign to add measurements. Data can be entered when taking the measurements directly through the Malusim phone app, or you can write down measurements and enter them later on the computer at https://malusim.org/. Once your measurements have been added, send an email within 24 hours after each 120DD measurement to Terence Robinson (tlr1@cornell.edu) copying your regional cooperative extension agent:

- Mario Miranda Sazo – Lake Ontario (mrm67@cornell.edu)
- Craig J. Kahlke – Lake Ontario (cjk37@cornell.edu)

We will send you back an assessment within 24 hours of thinning progress. Based on the results, you will be able to decide to spray again or not. Please feel free to contact your extension specialist if you would like to more information or any in-person training for your farm employees to conduct fruit measurements this year.

Things you HAVE to pay attention at every time you take the measurements
– Take data "precisely":
- Make sure you are ALWAYS taking measurements from the right cluster.

You might get confused if there are two clusters too close or if you used a long ribbon (flag) that can twist around nearby clusters. Try to avoid marking those too close clusters and do not use a too long a ribbon. Using wooden clothespins and spray-painting them orange and numbering them 1-15 is an alternative to flagging tape.

- Fruit are not round so ALWAYS pick the largest OR the narrowest size of the fruit to measure. If you choose to measure the largest side, then all the subsequent measurements have to be taken from the largest side as well.

- If you opt for not marking the fruitlets, please make sure you will not measure the same fruitlet twice at the same day.

- Make sure you are writing the measurements in the right position (tree and cluster) in the datasheet provided. However, fruitlets within each cluster do not need to be in order.

- If you find more than 5 fruitlets within the cluster just remove the weakest fruitlet. It will come off later anyways.

- If you break a cluster, please remove all the previous measurements.

Spray and Timing Options for Precision Thinning of MATURE Gala:

Option 1	Option 2
Apply a Bloom Spray NAA (4oz/100 gal TRV dilute basis - see below for TRV)	
Apply a Petal Fall Spray (5mm) NAA (3oz/100 gal TRV dilute basis) + Sevin (1pt/100 gal TRV dilute basis)	**Apply a Petal Fall Spray (5mm)** NAA (3oz/100 gal TRV dilute basis) + Sevin (1pt/100 gal TRV dilute basis)
Apply a 12 mm Spray Maxcel (64oz/100 gal TRV dilute basis) + Sevin (1pt/100 gal TRV dilute basis)	**Apply a 12 mm Spray** Maxcel (64oz/100=96oz/acre) + Sevin (1pt/100=2pt/acre)
Apply an 18 mm spray (if needed) Maxcel (64oz/100 gal TRV dilute basis) + Sevin (1pt/100 gal TRV dilute basis) + Oil (1pt/100gal water) **don't concentrate oil** (directed to the upper part of the tree)	**Apply an 18 mm spray (if needed)** Maxcel (64oz/100 gal TRV dilute basis) + Sevin (1pt/100 gal TRV dilute basis + Oil (1pt/100gal water **don't concentrate oil**) (directed to the upper part of the tree)

Spray and Timing Options for Precision Thinning of MATURE Honeycrisp:

Option 1	Option 2
Apply a Bloom Spray NAA (4oz/100 gal TRV dilute basis - see below for TRV)	
Apply a Petal Fall Spray (5mm) NAA (4oz/100 gal TRV dilute basis) +	**Apply a Petal Fall Spray (5mm)** NAA (4oz/100 gal TRV dilute basis) +
Sevin (1pt/100 gal TRV dilute basis)	Sevin (1pt/100 gal TRV dilute basis)
Apply a 12 mm Spray NAA (3oz/100 gal TRV dilute basis) + Sevin (1pt/100 gal TRV dilute basis)	**Apply a 12 mm Spray** NAA (3oz/100 gal TRV dilute basis) + Sevin (1pt/100 gal TRV dilute basis)

Apply an 18 mm spray (if needed) Sevin (1pt/100= gal TRV dilute basis) + Oil (1pt/100gal water) **don't concentrate oil** (directed to the upper part of the tree)	**Apply an 18 mm spray (if needed)** Sevin (1pt/100 gal TRV dilute basis) + Oil (1pt/100gal water) **don't concentrate oil** (directed to the upper part of the tree)

*TRV = Tree row volume

Spray Mixing Instructions Considering Tree Row Volume - TRV

• Plant Growth Regulator response is a function of the amount of chemical deposited on the leaves of the tree. The amount of chemical that is sprayed per acre should consider tree size to not over-apply chemical to small trees and under-apply chemical to large trees.

• Tree size can be used to adjust the amount of chemical added to the spray tank by calculating the size of the tree canopy (tree row volume). The tree row volume of an orchard is defined as the volume of water to spray the trees to runoff, which is termed a full dilute spray.

• The amount of chemical can then be adjusted to the size of the trees with fully-grown trees receiving a full amount (100% dose) and smaller trees receiving an appropriate fraction of a full dose.

• The volume of water used to carry the chemical to the leave can be less than the full dilute volumebut if less than the full dilute volume is used then the amount of chemical in the tank must be concentrated to allow the proper amount of chemical to be applied to each tree.

• The concentration factor is determined by dividing the full dilute volume of water (TRV) by the actual amount of water to be sprayed.

1. Calculate Tree Row Volume

(Tree height X Tree width X 43,560 X 0.7) / (Between row spacing X 1000)

• Example of a Tall Spindle Orchard

For many mature Tall Spindle Orchards this is ~200 gallons/acre

Example (11' X 7' X 43560 X 0.7) / (12' X1000) = 196 gallons/acre

2. Set sprayer up to spray ½ of Tree Row Volume (100 gallons/acre)This is a 2X application

3. Concentrate the chemicals in the tank 2X

Add the rate/100 gallons X 2 of each chemical (except oil or surfactants)

Adjusting the Spray Pattern

• Often the bottoms of trees show over-thinning while the tops of trees show under-thinning.

• Our standard recommendation is to nozzle the sprayer so that 2/3 of the spray volume is directed to the top half of the tree and only 1/3 is directed to the bottom half of the tree.

• Recent studies have shown that this still gives 65% of the fruit in the top half of a tall spindle tree and only 35% of the fruit in the bottom half of the tree.

• Our new recommendation is that for the bloom and petal fall sprays that spray pattern direct 2/3 of the spray to the top of the tree and 1/3 to the bottom of the tree. However, for a third spray at 10-12mm spray or a fourth spray at 18mm that all of the spray be directed to the top half of the tree and no spray be directed to the bottom half of the tree.

Please note that when you shut off the nozzles you need to adjust up the rate per acre. We still want to keep the same rate per acre, even though you are spraying only the top of the trees. The bottom part of the trees will get some drift and no need to be directly sprayed. More chemical has to go in the tank to account to the factor you shut off nozzles, because now one sprayer instead of covering five acres does ten acres. For instance, if your sprayer is going to cover 4 acres, you have to put the normal amount per acre four times in there. The reason for that is because the upper partof the tree gets so much light and produces much more carbohydrate, so those fruit have much greater carbohydrate supply than fruit from the bottom of the tree where you have more shade.

Announcing the 2021 Virtual Honeycrisp Meetup Summer Series

Mario Miranda Sazo (CCE-LOF), Anna Wallis (MSU), and Bernardita Sallato (WSU)

Following the positive response to the first 2021 IFTA Virtual Honeycrisp Tour, we are launching a series of Virtual Honeycrisp Meetups this summer. Meetups will provide an opportunity for nationwide conversation and discussion with grower and expert panelists on various topics. Webinars will be conducted live on **Thursdays at 4:00pm (PST)/7:00pm (EST),** on **June 3, June 17, and July 1.**

Details are still being confirmed for these **free** educational extension efforts. In the meantime, please mark your calendars! More details will be announced in the next few weeks.

This nationwide extension effort is being conducted in close collaboration with IFTA Education Director Greg Lang (MSU) and scientists from USDA-SCRI Root2Fruit project (led by Dr. Cheng at Cornell). With so much new information generated through the R2F project about Honeycrisp nutrient management and rootstocks, there is a tremendous value in having an **open discussion** and in an **inclusive virtual format** this summer. Each webinar will include a very short presentation and/or a video clip from the IFTA recordings followed by a panel of growers and R2F researchers to answer your questions.

Whether you are an experienced Honeycrisp fruit grower, one that has modest experience, or one that is planning to establish a modern Honeycrisp planting in the next 2-3 years, the virtual Honeycrisp meetups will be the right setting for you to ask questions and find the right technical information based on the most recent R2F science.

Updated 'Database of Apple Diseases'

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

Overview

The 'Database of Apple Diseases' (https://blogs.cornell.edu/applevarietydatabase/) is an online educational and information resource for apple disease management, developed and maintained by Awais Khan's Lab at Plant Pathology and Plant-Microbe Biology, Cornell University, Geneva to complement other web-based resources at Cornell University.

This is a comprehensive database of apple disease symptoms, rankings of cultivar susceptibility to major diseases, digital factsheets, and novel disease diagnostic options. Currently, it has high-resolution pictures of symptoms for common diseases of

apples and susceptibility ratings to fire blight, apple scab, powdery mildew, and apple rust for 329 apple varieties. We have uploaded digital factsheets for 10 common diseases of apples (fire blight, apple scab, powdery mildew, cedar apple rust, black rot and frogeye leaf spot, sooty blotch and fly speck, bitter rot, blue mold, root rot and apple anthracnose) with basic information about their biology, epidemiology, and management, as well as links to high resolution images of symptoms. We have also developed and uploaded animated videos to explain disease cycles and management of fire blight and apple scab in an easy-to-understand fashion.

If early disease detection is of interest to your operation, take a look at the 'Advanced Disease Diagnostics' section in the database. We have provided detailed information and videos to use cutting-edge disease detection methods.

Current and Future Updates

We are constantly fine-tuning and improving the website by collecting feedback from our stakeholders through electronic surveys. Our most recent update was the addition of four new diseases, to provide information on Quince Rust, White Rot, Nectria Twig Blight and Canker, and Apple Crown Gall.

Quince rust is a *Gynmnosporangium* rust disease like cedar apple rust that can cause 50-100% yield losses in optimum conditions. The disease starts as a purple ringed lesion on the underside of apple fruit and will eventually develop rust-colored aeciospores in tube-like growths. Quince rust causes fruit shape distortion, spongy fruit tissue, and early drop if the disease develops in the fruit stem. While quince rust is currently sporadic in the region, over the next few years climate change could lead to an increase in its preferred conditions.

White rot, more commonly known as bot rot, is caused by the fungal pathogen *Botryosphaeria dothidea*. It infects both woody tissue and the fruit, causing reddish-brown cankers in wood and watery, tan-colored rot in fruit. This disease can be difficult to differentiate from two other common orchard rot diseases, true Black rot (*Diplodia seriata*) and Bitter rot (*Colletotrichum gloeosporioides*). However, knowing key differences about how they develop can distinguish them.

Nectria twig blight and nectria canker are caused by two different *Nectria* species. While nectria twig blight is a minor apple disease, it causes symptoms similar to the early stages of fire blight and proper disease identification is crucial to prevent a serious outbreak. Nectria canker develops more elliptical lesions that slowly grow into large cankers with rings showing the growth cycles. Both diseases are known for producing orange perithecia spores that help the pathogen spread from tree to tree.

Crown gall is a bacterial disease caused by the bacterium *Agrobacterium tumefaciens* and has a significant economic impact, both by killing trees and lowering their productivity. The soil-borne pathogen causes the tree to produce growth hormones that result in warty tumors along the roots, stem, and branches. The rapid growth can cause cracking that exposes the tree to secondary infection or block the movement of water and nutrients through vascular tissue.

In the near future, we are also planning to modify the ranking of cultivar susceptibility to major diseases on the website to make it easy to search and sort the list. Other planned changes include adding new pictures of disease symptoms to show the variation in symptomology, and to add more photos of distinct symptoms to the disease factsheets.

If you have suggestions for improvements to 'Database of Apple Diseases' or you would like to see additional features, please contact Dr. Awais Khan at mak427@cornell.edu**.**

Figure 1. White Rot on Antonovka

Figure 2. Nectria twig blight

Mark Your Calendar- LOF's Virtual Petal Fall Thinning Meeting!

Our Next Virtual Meeting (CCE-LOF) will be Monday, May 14, from 4-5 PM via Zoom. Dr. Terence Robinson (Cornell) and Mario will use the current conditions and forecast to make petal fall thinning recommendations for WNY. There will be ample time for questions and discussion. At meeting time, please click this link, there is no need to pre-register:
https://cornell.zoom.us/j/98648616306?pwd=c3pSZWZuTDlYbU90Z3NGdTI1RmJtdz09

Meeting ID: 986 4861 6306
Passcode: 122343
Dial by your location: +1 646 518 9805 US (New York) or +1 646 876 9923 US (New York)

All of our educational videos are on our YouTube Channel at:
https://www.youtube.com/channel/UC6PXjEkx7nLDY1A81Ek5brQ

Cornell Cooperative Extension
Lake Ontario Fruit Program
12690 Rt. 31
Albion, NY 14411

Contents

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