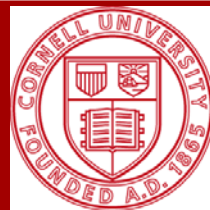




FRUIT NOTES

Lake Ontario Fruit Program



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Fill the Space and Get the Most of NY1 and NY2 Trees this Season

Mario Miranda Sazo and Terence L. Robinson

With weak growing cultivars such as NY1 or Honeycrisp or Jonamac, the lack of sufficient leader growth to reach the top of the trellis (10ft) by the end of the 3rd year is a serious problem that limits yield in future years. NY1 is a weak tree and does not achieve sufficient leader growth when grown on M.9 or B.9 rootstocks. It is very precocious and growth is often weaker than its 'Honeycrisp' parent. NY1's ability to set a heavy crop load in years two and three coupled with its low vigor can challenge the best growers to fill the tree spacing in the first 3 years. With more vigorous cultivars such as Gala, Fuji or McIntosh reaching the top of the trellis by the end of the 3rd or even as early as the end of the 2nd season is usually not a problem. However with weak growing cultivars growers need to intensively manage the trees in the first 3 years to achieve the desired growth. There are several important strategies for maximizing tree growth after planting and during years 2 and 3, including a balanced nutritional program, irrigation, excellent weed control and overall good orchard management.

Year of Planting: We recommend that NY1 and NY2 be planted as early as possible in the spring but not before the soil is dry enough to "flow well. If trees must be stored, keep them at 34°F storage. The storage room should be well aired without any ethylene from stored apples. Keep roots covered and moist, if not water well. Plant them at the first available opportunity when soil conditions warrant.

NY1 trees should be planted at close in-row spacing (3ft or less) using the more vigorous M.9 clones (Pajam 2, Nic 29), or G.41 (comparable to the large M.9 clones, fire blight resistant) or G.935 (comparable to M.26). G.41 will be especially useful when orchards are replanted on old orchard sites since it has some tolerance to replant disease. However, even when G.41 is used, few plantings over the last four years have achieved sufficient leader growth. Thus for the future, slightly more vigorous (but precocious) rootstocks like G.935, G.214, G.202 or G.969 should be used. At the moment G.935 and G.202 are the only ones on the list that are available for establishing high-density plantings for weak growing cultivars like NY1 and Honeycrisp.

Another strategy when planting NY1 trees is to plant the graft union closer to the soil line because of the cultivar's low vigor. This deeper planting depth may be a good strategy, but be careful not to go too far this year. We recommend you leave at least 3-4" of rootstock exposed to prevent scion rooting which gives variable tree vigor later in the orchards life since some trees scion root and others do not. Variable vigor complicates management when the orchard is mature. NY2's graft union should be the standard 6" above the ground level once the soil has settled.



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After planting, it is critical that you water trees in as soon as possible to ensure good root soil contact. Three gallons of starter solution prepared by using 5 lb./100 gallons of water of a soluble 20-20-20 fertilizer should be applied the day of planting. After soil has settled, additional nitrogen fertilizer should be applied. We recommend applying frequent small doses of nitrogen (1/4 lb. of calcium nitrate per tree) beginning 2 weeks after planting in a doughnut shaped band around each tree. The nitrogen can be applied by hand 4-5 times during May, June and early July (spaced every 2 weeks) or through the trickle irrigation (fertigation) with a concentration of 200ppm=0.75g N per gallon of irrigation water). Water should be applied 2-3 times per week (unless trees get more than 1" of rainfall that week) but with relatively small volumes each time (2-3 gallons per tree). The amount of water to be applied each day (or summed over several days) can be easily calculated using the new Cornell apple irrigation calculator on the NEWA website (<http://newa.cornell.edu>). Growers should use the calculator at least once per week to determine how much water to apply to the new or mature orchard. These applications of water and fertilizer encourage maximum and safe leader growth.

By the end of June leader growth should be 18-24 inches. Growers should keep the leader growing until the end of July through intensive water and nitrogen management and achieve 24-30" of shoot growth. To achieve this growers should (1) quickly install the new trellis and irrigation lines after planting, (2) select the leader when 2" long and remove buds #2-4 when 1" long, (if this is not done growers should cut competing shoots back with clippers to 2" long) to prevent competition with the leader, (3) grow the new trees without weed competition, aphids, corn borers, mildew, and fire blight, (4) water trees frequently (but not when soil is too wet) by trickle irrigation with low volumes per tree calculated using the new apple

irrigation calculator on the NEWA website, (5) remove flowers manually or chemically (see Maxcel recommendation for de-fruiting below) as soon as possible even at the tight cluster to pink stage. Even waiting until early fruit set will retard tree growth. Finally, (6) these plantings need frequent applications and small doses of nitrogen beginning 2 weeks after planting.

Trees planted in 2013 or earlier: Continued intensive water and nitrogen management will be particularly important for NY1 in the second, third and fourth years especially if 2014 brings dry stressful growing conditions (severe and prolonged heat, lack of rains, or severe winds). NY1 blocks that have had relatively poor nutritional and pest management could also be more affected under extremes weather events in 2014.

The leader should be attached to the trellis with a rubber band or a wire loop as soon as it reaches each successive wire. With young trees that have crop the unsupported terminal portion of the leader above, the last wire should be defruited for maximum shoot growth and good lignification during years 2, 3 and 4. Interestingly, the wrapping of the leader around a vertical wire stabilizer works, supports the leader, and encourages new growth above where it is supported by a tie at the trellis wire.

For NY1 trees which had moderate or poor growth in the first year or were planted on a weak rootstock, these trees should be de-fruiting because fruits will outcompete with overall tree and shoot leader growth for carbohydrates and water. We recommend that you manually remove all blossoms for NY1 in year 2 (and in very few cases in year 3). An alternative to hand blossom removal is a high rate of Maxcel (100ppm=64oz/100gallon) plus 2pt Sevin/100gal + 1pt oil/100 gallons when fruitlets are about 5-7mm. Pick a warm day for this spray.

Incorporate Appropriate Amounts of Phosphorous During PrePlant Soil Preparation

Lailiang Cheng and Terence L. Robinson

Soil phosphorous should receive the most attention during soil preparation before the apple orchard is planted. Movement of phosphorous into the soil from surface applications is extremely slow in most situations, and thus primary emphasis in established orchards should be on maintaining an “adequate” level of phosphorous as determined by leaf analysis rather than soil testing.

Incorporation of appropriate rates of phosphorous during preplant soil preparation is the best means of providing adequate phosphorous for the lifetime of the orchard. The recommended amounts of preplant phosphorous for various soil test levels are indicated in the following Table 1. The amount of phosphorous to be added is the sum of topsoil plus subsoil requirement.

Table 1. Soil test phosphorous values and rates of phosphate (P₂O₅) application for orchards.

Soil test value P (lb./acre)	Amount of P ₂ O ₅ to apply (lb./acre)	
	Pre-planting	Established Orchard ¹
< 1	120	60
1-3	100	60
4-8	60	30
> 9	40	0

¹Do not apply phosphate to established orchards unless leaf analysis also indicates a need.

Disease Management in Stone fruit

K. Cox and D. Breth

When flower buds start to show color is a critical period for brown rot management, and a time to begin evaluating your management plan for brown rot.

Brown rot and European Brown rot:

In NY and even neighboring states, sterol demethylation inhibiting fungicide (DMI or SIs: Indar, Rally, Tilt, Quash, Inspire Super, etc.) resistance in populations of *Monilina fructicola*, the causal agent of brown rot, is fairly widespread. However, DMI resistance in *M. fructicola* is effected by rate and intrinsic activity of the fungicide in question. Fortunately, we have new DMI chemistries (i.e. difenoconazole in Inspire Super) and higher rates than we had in previous years. Hence, the DMIs may be a more viable option in early covers. Previously, we had observed a slow incremental resistance to the components of Pristine (QoI/Stroby & SDHI) in orchard populations in 2006-2010. Interestingly,

we have not found any populations with resistance to DMI and QoI fungicides in recent years. Although, little can be said about the persistence of resistance in orchards in the region, it may be that in the case of both of these fungicide chemistries can be used sparingly and in rotation. Additionally, we have Merivon under an SLN label. Merivon is a new QoI/Stroby & SDHI combination product that is labeled for stone fruit with a 0 day PHI. The SDHI component in Merivon is unlike the previous SDHI fungicide boscalid, which was included in Pristine. We found Merivon to be very effective against brown rot and other fruit rots when used pre and post harvest. Most excitedly, Merivon can even be used on sweet cherries.

Currently, we are in the time of year when European brown rot is likely to play a larger role in brown rot infections, and the causal agent of European brown rot, *M. Laxa* is incredibly

sensitive to both DMI and QoI chemistries even in the same orchard. Tart cherries, sweet cherries, apricots and nectarines are the most susceptible to European brown rot, which must be managed during cool wet weather at bloom. Also, if there's time, please remove any mummies from the orchard as they will contribute to considerable inoculum. If you do remove mummies, take them from the orchard as the spring winds could carry spores from the orchard floor.

Begin fungicide sprays at pink or white bud using Bravo/Echo/Equus (chlorothalonil). If you had blossom or shoot blight in cherries, there is a strong possibility that you have European brown rot in your planting. In this case, start with one of the DMI or SI fungicides instead. but not after petal fall, or one of the DMIs. After this application, continue with a Bravo/Echo/Equus (chlorothalonil), program until shuck-split has passed. During this time, consider bringing in Rovral (iprodione), which is a different fungicide chemistry that can be used until shuck split.

As you approach pre-harvest periods, Rotate between fungicide classes to manage fungicide resistance in brown rot populations. Also, consider the following:

- Alternate DMI with QoI/SDHI (Pristine or Merivon) fungicides during cover sprays to prevent the development of quantitative fungicide resistance. With the 0 day PHI and excellent activity against post-harvest rot fungi, consider finishing the pre-harvest program with Merivon.
- If allowed on the crop and practical for your spray plan, use an AP fungicide (Scala SC, Vanguard). Vanguard at 5 oz./acre is labeled for a maximum of 2 sprays per season (but not on sweet cherries), or Scala at 9-18 oz./acre (but not on cherries) using the low rate in mixtures with other fungicide. Scala is labeled for use on apricots, peaches, and plums. Vanguard is labeled on apricots, tart cherries, peaches, and plums.
- Bear in mind that if the weather is favorable for brown rot, product failures are possible

even with a little quantitative (incremental) resistance.

- The key to preventing the development of fungicide resistance is to use appropriate rates. Do not reduce rates or practice alternate row spraying.
- Make sure to provide considerable protection in the period from petal fall to pit hardening. This is a period when stone fruit (except tart cherry) are susceptible to brown rot infection, but the infections may not necessarily become active or apparent until the fruit get closer to ripening.

Black Knot on plums and cherries:

The black knots you see right now in plums and tart cherries will provide ascospores that will shoot under rainy conditions and infect succulent green twigs of the current season's growth usually at the leaf axils.

Ascospores can be available from these black, tumor-like infections as early as bud break until terminal shoot growth stops, but the main window when most of the ascospores are available and the most susceptible tissue is exposed is between white bud and shuck split. The end of the primary infection season can be extended through June if we have a dry spring. Only a few hours of rain apparently are required at temperatures above 55° F to result in a black knot infection, whereas much longer rainy periods are required to produce infection at temperatures below 55° F.

Knots from the current season's infections may become visible by the late summer of the year of infection but are usually not noticed until the following spring, when they begin to enlarge rapidly. The young knots the year following infection are capable of producing a few ascospores but ascospores are often not formed until the second spring. In some situations – what you are seeing in your trees now is a result of an infection 2 seasons ago!

Control of this disease requires some vigilance in pruning out visible swellings from last season as well as the black knots that have fully matured. Check your hedgerows for wild black cherry trees

that also harbor black knot. It may take a few seasons to clean up an epidemic. Be sure to burn the black knots you remove from the orchard since they will continue to contribute ascospores from the knots until they are destroyed. In severe pressure, you should consider application of fungicide as early as budburst, but under lower pressure, fungicide can be delayed until white bud. The fungicide that has performed best in

trials is Bravo (chlorothalonil sold as other generics), but alternatives include captan or Topsin M (only registered for brown rot blossom blight in cherries). Be sure to stop chlorothalonil applications at shuck split. Chlorothalonil and captan applied for black knot will also double for brown rot blossom blight protection in tart cherries and plums and will be good choices in fungicide resistance management strategies.

Focus on Food Safety Series – Part 2

An Overview of Foodborne Illness in the US

Craig Kahlke & Betsy Bihn

For an outline and overview of this multi-part series, see part 1.

The Center for Disease Control (CDC) estimates that each year roughly 1 in 6 Americans (or 48 million people) gets sick, 128,000 are hospitalized, and 3,000 die of foodborne illnesses. There is much more information here on the CDC website following their 2011 estimates/findings.

<http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html>. **It is important to realize these are ESTIMATES because not everyone who has a foodborne illness is documented.** Many people get flu-like symptoms, diarrhea, stomach cramps, etc. for a day or 2, do not go to the doctor, and then recover. Many such instances are likely to be caused by foodborne illnesses that go unreported, in many cases severely under-reported. For instance, the CDC estimates that for salmonellosis, the illness caused by certain strains of *Salmonella* bacteria, 36 times more people have may have contracted salmonellosis than report it. Unfortunately, an increasing number of the US population have weakened or compromised immune systems, making them more susceptible to foodborne illnesses. Immuno-compromised groups include the elderly, young children under 5, pregnant women and those with organ transplants. Since it

is impossible to know the health status of those that eat fresh produce grown on your farm, reducing produce safety risks is one way to protect all consumers.

To understand some of the data presented next, it is important to understand the distinction between a foodborne illness and a foodborne outbreak. An illness is a confirmed case of an individual becoming sick from a foodborne pathogen. This requires testing and confirmation via a health department or medical facility, and linking the pathogen to its source (e.g. *Salmonella* from eating chicken from a specific source). An outbreak is defined as 2 or more confirmed illnesses in people resulting from the same pathogen and source. Although this is very tough to do, recent advances in pathogen subtyping and communication systems such as PulseNet make it possible.

Before we talk specifically about fresh produce, it is important to realize that foodborne illnesses can be associated with all types of foods. High profile foodborne illness outbreaks associated with undercooked hamburgers are remembered by many, but as **Figure 1** shows, produce was implicated as the cause of about 15.6% of FDA-regulated outbreaks from 1996-2006. These outbreaks led to 37.3% of all illnesses in the same

time period (Figure 2.). These two figures are included to highlight the fact that fresh produce can be the vehicle for human pathogens and once consumed, result in illnesses and outbreaks.

There are many attributes that make fresh produce a good vehicle for human pathogens. Fruits and vegetables are often eaten uncooked, so there is no cooking step to kill pathogens that may be present. Produce is grown in the open environment that includes risks from wildlife, wind, water, and soil. Unfortunately, many different commodities have been associated with illnesses and outbreaks. **Figure 3** shows a collection of fresh produce items that became contaminated resulting in illnesses. Although sprouts, leafy greens, tomatoes, and melons lead

the way, accounting for over 70% of produce-related outbreaks, commodities such as berries and green onions are also implicated. The important point to understand is that all produce can become contaminated, so understanding produce safety risks on your farm and how to reduce them is very important to protecting the fresh produce you grow.

In the next installment (part 3) of this series, we will examine the pathogens that most frequently cause foodborne illnesses associated with fresh produce. Understanding a little bit about the microorganisms and what they need to survive and multiply is important to understanding how to assess and minimize risks on the farm.

Figure 1

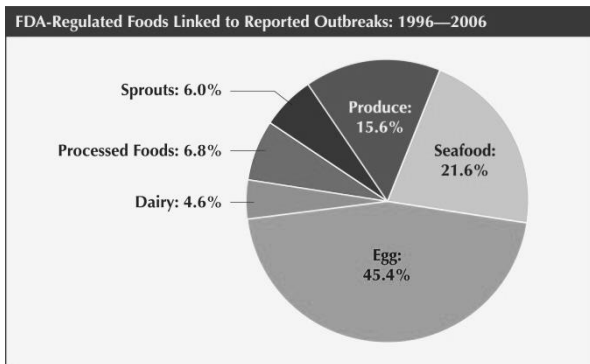


Figure 2

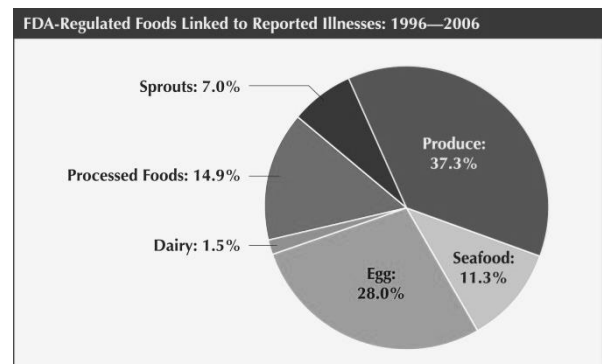
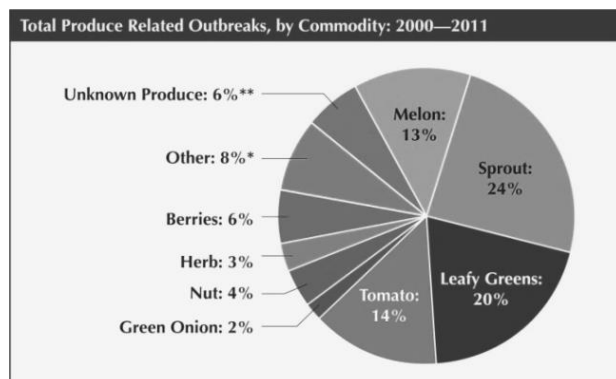


Figure 3



Precision Crop Load Management Training for NY Fruit Industry in Geneva (and via Polycom to 3 Satellite Sites)

Tuesday May 6, 2:45-4:45pm:

Mario Miranda Sazo

The CCE Lake Ontario Fruit Program and Dr. Robinson will be organizing the second Precision Thinning Workshop for NY growers and consultants in Geneva between 2:45-4:45pm on Tuesday May 6. It will also be offered via Polycom at the CCE Orleans (Albion), CCE Clinton (Plattsburgh) County offices, and at the Hudson Valley Lab. Last year more than 30 people attended the first precision thinning workshop and learned about a new precision thinning program to manage apple crop load. More than 20 cooperating growers, consultants and extension staff implemented the precision thinning program on Gala and Honeycrisp cultivars in NY. This new method allowed growers to first determine a target fruit number and the initial fruit number per tree and then apply sequential thinning sprays. The program utilized the Cornell Apple Carbohydrate Thinning model and the Fruit

Growth Rate model to provide real time information to growers via the LOF Fruit Fax and LOF newsletter. The program gave growers confidence to thin when appropriate and was easily applied to more simple trees such as the Tall Spindle or Super Spindle where fruit counting of whole trees was easier than large trees.

The program was successful in guiding chemical thinning decisions in 2013. This year we again encourage you to consider the economic implications of optimum crop load and optimum fruit size for maximum profitability. The advantages of doing the right things at the right moment justify this more intensive management approach required by the Precision Thinning Program. Please consider attending the coming trainings in Geneva, Albion, Plattsburgh, or at the Hudson Valley Lab on May 6.

Brewery/Cidery Workshop May 9-10 in Waterloo

The Seneca County Cornell Cooperative Extension will host a Brewery or Cidery Startup Workshop on May 9 and 10 at the Waterloo Holiday Inn on Route 414.

The schedule is as follows:

- Day 1 — Business and Legal Issues, 8:30 a.m. to 4:45 p.m. (social hour 4:45 to 6).

This workshop is meant to give you an overview of the information and tools you will need to start a new farm brewery or cidery business. Learn about the New York State Farm Brewery law, craft **beverage** marketing, brewing and cider

equipment, tax implications for a brewery or cidery, business planning, local zoning issues, alternative funding strategies, financing a brewery/ cidery and more. There will also be a trade show with company representatives selling items related to beer and cider production and growing hops, barley and cider apples and other relevant organizations.

The cost is \$65 or \$55 for additional people from the same aspiring brewery or cidery. This includes a light breakfast, lunch and an evening social hour that will include tastings of local craft beers and ciders.

**Lake Ontario Fruit Program
Cornell Cooperative Extension
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- Disease Management in Stone Fruit
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- Precision Crop Load Management Training for NY Fruit Industry in Geneva (and via Polycom to 3 Satellite Sites) May 6
- Brewery/Cidery Workshop
- Insert – Premier Apple Coop., Inc. 2014 Marketing Forum Registration Form

Speakers include Sam Filler, a craft beverage specialist for Empire State Development; Bill Barton of Bellwether Hard Cider; Whitney Russell of the New York State Office of Building Standards and Codes and the Lake George Zoning Board; and Victor Pultinas of Lake Drum Brewing.

- Day 2 — Production Issues, 8:30 a.m. to 3:30 p.m. starting at the Waterloo Holiday Inn.

This workshop will focus on production issues and will include classroom sessions (starting at 8:30 a.m.) and an optional field trip (from 11 a.m. to 3:30 p.m.) to Climbing Bines Hopyard and Farm Brewery and a nearby barley field, or to Bellwether Hard Cider and Black Diamond Farm. Classroom sessions will include a brewing track and a cidery track.

The cost is \$30 for the classroom sessions (which includes a continental breakfast) and an additional \$30 for either of the field trips (which includes a bagged lunch). There is a \$5 discount for the classroom sessions if you are also registered for Day 1.

Speakers include Bill Verbeten of Cornell's Northwest New York's Dairy, Livestock and Field Crops Team; Steve Miller, Cornell's New York State hops specialist; and Ian Merwin of Cornell's Department of Horticulture.

To register or for more information, visit www.senecacountyccce.org or call Derek Simmonds at 406-8236.