FRUIT NOTES
Lake Ontario Fruit Program

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Predicting Green Tip in 2013

Terence Robinson and Mario Miranda

A Review of Dormancy and Winter Bud Development

The physiology of trees during dormancy it is highly complex. A simplified explanation of what we understand is as follows:

1. In late summer, growth inhibitors (natural chemicals) build up in fruit buds which prevent them from growing even though temperatures are favorable. This is to prepare the tree for winter and is called summer dormancy. This type of dormancy is the reason why we can summer prune in the month of August and not cause regrowth of the shoots whereas such summer pruning in June will cause shoot regrowth.

2. As trees experience cold but non-freezing temperatures in the fall and winter the level of inhibitors in the buds gradually declines. When inhibitor levels are high, buds will not begin to grow even if warm temperatures are experienced. This is termed “rest”. At some point in the winter when enough cold temperatures have been experienced the level of inhibitors is lowered enough in the buds that they will begin to grow if warm temperatures are experienced. This point is called “rest completion”.

3. The internal physiological events associated with rest completion are still unclear but the progression from summer dormancy to rest completion has been modeled using accumulated cold temperatures. A temperature accumulation unit termed “a chill unit” was developed which is defined as 1 hour at the optimum temperature for chilling (45°F). Experimental data has shown that temperatures in a 15 degree band above and below 45 have a positive effect on chilling and contribute a partial chill unit for each hour of such temperatures. In contrast, temperatures above 65°F have a negative effect on chilling and subtract a partial or whole chill unit from the total. Experimental data has also shown that many apple varieties require 1000 to 1200 chill units to reach rest completion. To predict when enough chill units have been accumulated for rest completion, chill units are summed beginning at the onset of summer dormancy in late July. Hourly temperatures are assigned either a positive, negative or fraction of a chill unit. Usually the warm temperatures in August and early September result in a negative chill unit accumulation which does not help end rest. However, with the arrival of cool temperatures in late September and early October, positive chill units are usually accumulated. Once positive chill units begin to accumulate a running total is calculated from that point forward and the end of rest is predicted when 1200 chill units have been accumulated. In New York this usually occurs in late December or early January.

4. Once rest is completed, buds can respond to temperatures greater than 40°F. However a significant accumulation of warm temperatures (above 40°F) is required before visible bud development can be seen although non-visible development inside the closed bud is occurring with each hour of warm temperature. This process is termed heat unit accumulation and the units used to measure it are growing degree hours. Experimental data has shown that about 2500 growing degree hours (base 40°F) are required from the end of rest completion until green tip. In most winters in NY, the cold temperatures of Jan., Feb. and early March limit heat unit accumulation so that even though rest has been completed in late December or early January, buds do not begin to develop until warmer temperatures arrive in late March and April.

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Chill Unit and Heat Unit Accumulation During the Winter of 2012/2013

The winter of 2012/2013 has been quite normal with numerous days in the fall and early winter with optimum temperatures for chill unit accumulation 32-60°F (Figure 1). Using the chill unit model developed in North Carolina which is an improved version of the original chill unit model from Utah we estimate that in Western NY, chill units began to be accumulated in late September (18th) and reached an accumulation of 1200 chill units on Jan. 9, 2013 (Figure 2). It should be noted that low chill varieties of stone fruits which require less than 1200 chill units completed rest even earlier than most varieties of apple.

Following the completion of rest in early January 2013, fruit trees in Western NY have been responding to warm temperatures (accumulating heat units) with non-visible bud development leading toward bud break. Our calculations of growing degree hours in Western NY (Williamson) since the completion of rest in early January show that trees have accumulated only 1285 growing degree hours by March 25th of the 2500 hours needed for green tip (Figure 2). (Recall that last year we had reached the 2500 hour level by March 22). This is about 50% of the 2500 total hours needed to reach green tip. This indicates that although we have accumulated some heat units we still need a significant number of additional heat units to reach green tip of apple.

Forecasting Bud Break in the Spring of 2012

Using forecasts for the next 3 weeks (until April 18) we estimate that green tip in apples will be on April 16 for early bloom varieties (Idared) and on April 17 for later blooming varieties (Delicious) at Williamson NY. The weather forecast indicates we will slowly accumulate growing degree hours in the next 2 weeks and then rapidly accumulate growing degree hours after April 6. We caution that the estimated date of green tip is dependent on the accuracy of the weather forecast we used and the accuracy of the models (which in most cases is quite good). Our prediction of April 16 should allow growers a little more time to finish up winter pruning and get spraying equipment ready; but we suggest growers be ready to begin fungicide sprays to control scab by April 9.

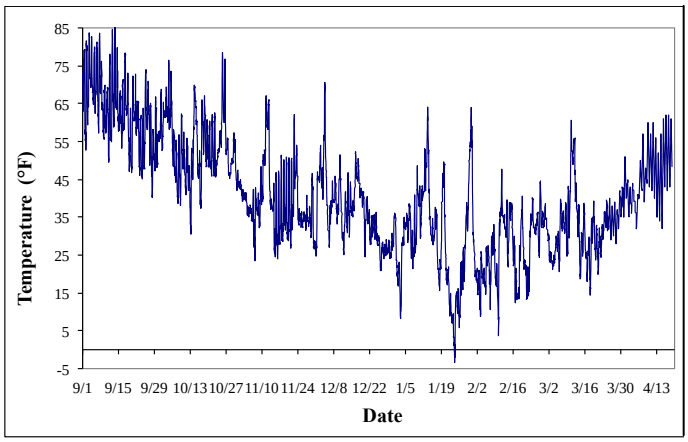

Fig. 1. Hourly temperatures at Williamson, NY over the fall and winter of 2012/2013 through March 25, 2013 with forecasted temperatures from March 25-April 18, 2013.

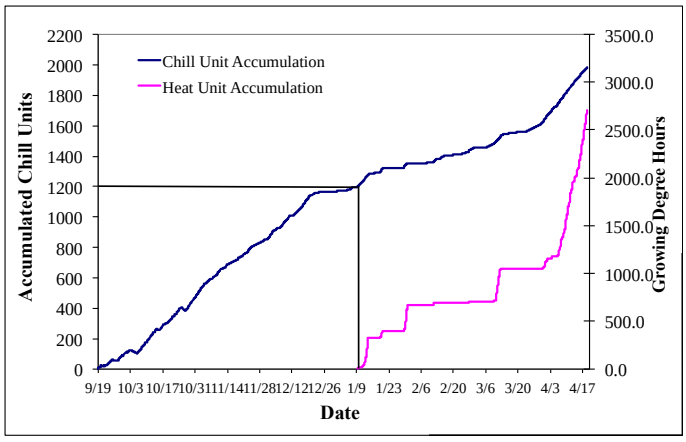

Fig. 2. Accumulated chill units after Sept.18, 2012 (blue line) and accumulated growing degree hours after 1200 chill units (pink line) at Williamson NY during the fall and winter of 2012/2013 through March 25, 2013 with forecasted temperatures from March 25-April 18, 2013.

Considerations for Copper Sprays in Tree Fruits

Dave Rosenberger

Copper fungicide/bactericide sprays have proven useful for managing fire blight of apples and pears, peach leaf curl and bacterial spot on peaches and nectarines, and bacterial canker on cherries and apricots. When a fixed copper is applied to apples at green tip to suppress fire blight, the copper in that spray will also provide protection against apple scab equivalent to that provided by mancozeb applied at 3 lb/A. Copper is no longer presumed to provide reliable suppression of scab ascospores even though copper sprays will protect green tissue from infection when applied before spores are released. Several lines of evidence suggest that the

annual use of copper at green tip may also help to suppress DMI-resistant apple scab. However, more work is needed to verify if and why a single copper spray in spring might impact resistance to DMI fungicides.

Many different copper products are registered for these uses, and it is difficult to know which product to select for any given application. Factors that impact activity of copper were discussed in an article published last year (*Scaffolds Fruit Journal* 21[1]:6-9; 12 March 2012). In this article, we revisit a few key issues related to the effectiveness of copper.

In the past, copper products applied to tree fruits at or near bud-break were almost all "fixed coppers" that had low solubility in water. When fixed copper products are mixed with water in a sprayer, the spray solution is actually a suspension of copper particles, and those particles persist on plant surfaces after the spray dries. Copper ions are gradually released from these copper deposits each time the plant surface becomes wet. **The gradual release of copper ions from the copper deposits provides residual protection against plant pathogens. At the same time, the slow release of copper ions from these relatively insoluble copper deposits reduces risks of phytotoxicity to plant tissues.**

Fixed coppers include basic copper sulfate (e.g., Cuprofix Ultra Disperss, Basic Copper Sulfate), copper oxide (e.g., Nordox), copper hydroxide (e.g., Kocide, Champ), copper oxychloride sulfate (e.g., COCS), and copper ions linked to fatty acids or other organic molecules (e.g., Cueva). Note that basic copper sulfate behaves differently than the non-basic form of copper sulfate, also known as copper sulfate pentahydrate or bluestone. The addition of hydroxyl ions changes copper sulfate into a relatively non-soluble fixed copper. With traditional Bordeaux mix, which is a mixture of copper sulfate plus lime, the chemical change occurs in the spray tank as the hydroxyl ions from the lime complex with the copper sulfate to form a fixed copper.

Efficacy of fixed coppers is dependent on both the amount of elemental copper applied and on how finely the copper has been ground. The impact of particle size becomes obvious when one realizes that a spherical particle with a diameter of 2.8 microns, common in older copper formulations, contains 64 times more volume than a sphere with a diameter of 0.7 microns. Therefore, copper products with a median 0.7-micron particle size theoretically have 64 times more copper particles distributed across and adhering to treated plant surfaces than would occur following application of a copper product with a 2.8-micron particle size if rates of both products were adjusted so as to generate the same rate of metallic copper per acre. Furthermore, research has shown that the larger copper particles are more subject to removal by wind or rain acting on the leaf surfaces after sprays have dried. **Thus, one can achieve both better coverage and better residual activity with a finely ground copper compared to a coarsely ground copper.** That fact has allowed manufacturers to gradually reduce the labeled rates for actual amounts of copper applied per acre in new products.

Reducing the total amount of copper applied in each spray is desirable so long as efficacy is maintained because copper can accumulate in soils. High levels of copper in soil have negative impacts on both plant growth and on earthworms and other non-target organisms. **However, even with the best formulations, there will be an end-point where the amount of elemental copper applied in bud-break sprays will no longer provide enough residual activity to suppress fire blight and bacterial canker. That low-rate end-point has not been defined for tree fruit applications,** but it undoubtedly varies both with the product used and with the post-application weather in any given year. Copper applied to suppress fire blight may have little impact on disease development if all of the copper residues are removed by heavy rains before trees reach the tight cluster or pink stage of bud development.

Over the last several years, a number of new copper formulations have appeared on the market with labels that allow for only very low rates of elemental copper in each application. Some of these products (MasterCop, MagnaBon, Phyton 27AG) contain copper sulfate pentahydrate rather than a fixed copper, and they therefore are more soluble in water. Manufacturers are claiming “systemic activity” for some of these products, and the higher solubility of these products may in fact allow more uptake into plant tissue. However, efficacy of these “low-rate” copper products in bud-break sprays is questionable because we lack convincing evidence that the low rates of copper that can be applied with these products will provide the residual activity that we believe is needed to suppress bacterial diseases in deciduous tree fruits. These low-rate copper products may work very well where repeated applications are made at regular intervals as occurs with citrus and some vegetable crops, but more research is

needed before they can be recommended for sprays at bud-break on apples and stone fruits.

Most copper labels list a broad range of rates for bud-break sprays. In general, **the upper end of labeled rates are suggested for applications that are made at silver tip or green tip on pome fruits,** especially when those bud stages occur early and one can therefore expect a long, drawn-out timeframe for bud development. **The lower ends of labeled rates are suggested for applications at green tip (or even at half-inch green, in an emergency) if one expects trees to advance rapidly** from bud break to bloom. Using excessive rates of copper, especially finely ground coppers that have good residual properties could result in fruit russetting on some apple cultivars if copper ions are splash-dispersed to developing fruit tissue after flowers reach pink or bloom.

With the fixed copper products, there is no published evidence that adding spray lime for tree fruit applications will either reduce phytotoxicity or extend the residual activity of the copper. However, some sweet cherry growers have reported that they achieve better control of bacterial canker when they add spray lime to copper sprays even if they are using a fixed copper that theoretically does not need any additional lime. Lab evaluations of seven different fixed copper formulations revealed that, when mixed at rates commonly used for dilute applications, the copper solutions in the spray tank will have a pH near 8 whereas adding spray lime at 2 lb/100 gal raises the pH to 11.0-11.5. (The old traditional Bordeaux mix formulation of 8-8-100 that was recommended for bud-break sprays also as a pH near 11, whereas a Bordeaux mix with 8 lb of copper sulfate and only two lb of spray lime has a pH near 8.) Thus, it may be that the high pH of both the old 8-8-100 Bordeaux mix and of the fixed copper-plus-lime solutions used by some cherry growers can reduce populations of the bacterial canker pathogen in ways that exceed the capabilities of a fixed copper applied alone.

Fungicides for Early-Season Disease Control in Apples

Dave Rosenberger and Kerik Cox

For apple growers in New York, the list of available fungicide chemistries has changed very little since last year. However, fungicide strategies may still need to be adjusted to compensate not only for increasing levels of fungicide resistance in the apple scab pathogen, but also for resistance problems in apple powdery mildew.

By now, most apple growers know that the DMI fungicides (Rally, Procure, Indar, Inspire Super, Topguard, etc.) no longer control apple scab in some orchards. Initially, we felt that Indar and Inspire Super might continue to control scab in orchards where Rally and other first-generation DMI fungicides were no longer effective. In fact, trials at Geneva clearly showed that Indar and Inspire Super provided control of scab on Empire apples where Rally was no longer effective. However, those same trials showed that the advantage of Inspire Super over Rally was less apparent on the more scab-susceptible Cortland cultivar.

When McIntosh growers attempted to control DMI-resistant scab with Inspire Super, disastrous levels of scab often develop very quickly. Therefore, we strongly recommend that growers completely avoid Indar and Inspire Super during the spring scab season if they know (based on lab tests) or suspect (based on control failures) that Rally, Procure, or other DMI fungicides are no longer effective against apple scab in their orchards.

Many Michigan and Pennsylvania orchards have apple scab populations that are also resistant to the QoI or strobilurin fungicides (Flint, Sovran, Cabrio, Pristine). So far as we know, the QoI fungicides are still effective against scab in most orchards in New York and New England, although a shift toward resistance has been noted in lab tests for some orchards. To maintain the effectiveness of the QoI fungicides against scab, they should be used only in protectant spray programs wherein products are applied at roughly 7-day intervals during the peak scab and mildew period between tight cluster and first cover.

More recently, both DMI and QoI fungicides have been showing weaknesses against apple powdery mildew. For reasons that are not entire clear, Inspire Super has always been weaker against mildew than Rally or Topguard. However, even Rally used at 6 or 8 oz/A is no longer controlling mildew in some orchards, and we must therefore assume that mildew is fully resistant to DMI fungicides in these orchards. Dr. Keith Yoder at the Winchester fruit research station in Virginia has also shown the mildew activity of QoI fungicides such as Flint has gradually decreased in his test orchard in

recent years. Some growers have also been reporting more mildew than would be expected where Flint or other QoI fungicides had been applied several times during the key mildew control period between tight cluster and second cover.

Apple growers must now face the possibility that both the DMI and QoI fungicide groups may fail to provide acceptable control of mildew, especially if they are applied in only a few sprays per year as was the common practice after DMIs were introduced. New York growers should consider incorporating sulfur into their spray programs in orchards where DMIs and/or QoIs were used last year and mildew was still a problem. There is no evidence that mildew will ever become resistant to sulfur.

Sulfur lacks post-infection activity against mildew and therefore must be applied earlier in the season than was typical when mildew was controlled with DMI fungicides. Sulfur at 3 to 8 lb/A (depending on tree size, inoculum levels, cultivar susceptibility, and the brand of sulfur used) should be incorporated into every spray starting at half-inch green if other fungicides are no longer working against mildew. Where other fungicide chemistries are still working, their useful life might be prolonged by including sulfur in at least two or three sprays between tight cluster and second cover, thereby reducing selection pressure for fungicide-resistant mildew both by using different chemistries in successive sprays and by avoiding inoculum build-up that occurs if no mildewcides are applied until petal fall.

In states other than New York, apple growers have some new options this year. Four new products, Fontelis from DuPont, Merivon from BASF, and Luna Sensation and Luna Tranquility from Bayer have all been registered by EPA for use on apples. These new products all contain the SDHI chemistry (SDHI = succinate dehydrogenase inhibitors) and therefore block a different biochemical pathway than either the DMI or QoI fungicides.

Merivon and the Luna products have excellent activity against mildew. Fontelis, though slightly less effective against mildew than the others, is still quite good. However, SDHI-resistant mildew may develop quickly if the new SDHIs are used as a stand-alone chemistry to control mildew. That scenario could develop where the DMIs and QoIs have failed or are failing against mildew. Thus, even when/where SDHIs are available, we may need to start including sulfur at various timings in all spray programs as a resistance management strategy for powdery mildew.

It seems unlikely that any of these new SDHI-containing products will gain NY registrations in time for the 2013 season. The lack of NY registrations for the new SDHI fungicides in 2013 is less important than one might initially assume because none of these new products will provide “silver bullet” solutions for controlling fungicide-resistant scab and mildew. The new products are relatively expensive (as new chemistries always are), and even when/where they are available, they will need to be mixed with a contact fungicide (captan or mancozeb) for scab control. The SDHI fungicides should never be used as “bail out” sprays to arrest scab epidemics after lesions are visible because doing so may lead to very rapid development of resistance to the SDHI fungicides.

In summary, key points for effective scab and mildew control in 2013 include the following:

1. **Keep inoculum levels low:**
   - Use urea sprays or leaf shredding (fall or spring before green tip) to reduce over-wintering scab populations where scab was a problem last year.
   - Maintain tight scab spray schedules during the prebloom period to prevent primary scab that would otherwise produce huge quantities of conidia during late bloom and petal fall.
   - Including a mildewcide in all sprays between tight cluster (or half-inch green if using sulfur) and second cover to prevent mildew from getting a head start as will occur if no mildewcides are applied until petal fall.

2. **Avoid using fungicides that are no longer effective in your specific orchard:**
   - The first warning sign for fungicide resistance is decreasing effectiveness of products or chemistry groups that always worked well in the past. Heed the early warning signs by switching to different chemistries BEFORE resistant pathogens create disastrous losses.
   - If necessary, plan to control scab and mildew by using combinations of mancozeb, captan, and sulfur. A tank-mix that includes all three of these fungicides will provide excellent protection against scab, rust, and mildew so long as there are no gaps in coverage.

3. Where dodine, DMIs, and/or QoI fungicides are still effective, continue to use them judiciously:

- When they are working, programs that include these fungicides are more powerful than those that consist of only captan, mancozeb, and sulfur.
- Dodine (Syllit) can provide valuable added protection against scab in high-inoculum orchards if it is tank-mixed with mancozeb or captan in one or two applications between green tip and tight cluster. However, the manufacturer has specified that **Syllit should never be mixed with copper or chlorpyrifos** because, under some conditions, those tank mixes have generated nozzle-clogging coagulates in the spray tank.
- QoI fungicides (or one of the new SDHI fungicides if/when they are available) provide extra protection against both scab and mildew when used in two applications sometime between tight cluster and first cover. However, both the QoIs and the SDHI products must still be tank-mixed with captan or mancozeb for scab control.
- Where they are still working against mildew, DMIs (other than Inspire Super) are best used at petal fall and first cover to target the peak risk periods for mildew and rust diseases. Inspire Super may still be useful in prebloom sprays where DMIs are still working against scab or in summer sprays targeted at sooty blotch and flyspeck.

Start Using the New I-9 Form A. De Marree

A new I-9 Form was released by the federal government on March 8, 2013 – it will expire in March 2016. The old form expired at the end of August 2012. Growers do have a 60 day grace period in beginning to use the new form, but I recommend that all growers go to the Homeland Security website and download the new form as soon as possible at www.uscis.gov/files/form/i-9.pdf . There is also a Spanish version of the form.

The new I-9 form is nine pages long – six pages of instructions and 3 pages of actual form. Please read the instructions for completing the form carefully **before** using it for the first time. The new form was designed to be easier to use, less likelihood of making mistakes.

A blank I-9 form may be reproduced, as long as all sides are copied. The instructions and a list of acceptable documents must be available to all employees completing the form. Employers are required to retain the parts of the form in which the employee and employer enter data for as long as the employee remains in your employment. Once employment ends, the employer must retain the form for either 3 years after the date of hire or 1 year following the date employment ended, whichever is longer.

NOW is the Time to Begin Reviewing Grade-outs and Returns on the 2012 Crop!

A. De Marree

Growers have many things to remember concerning growing, harvesting, marketing and managing a fruit crop and memory overload occurs on a regular basis, leading to faulty memories! (In other words, your memory is NOT as accurate as you think it is.) **Before** the 2013 crop season begins, it is a good idea to examine and organize information from your pack-out statements in a manner in which you can use the information to make intelligent decisions. I like to use a spreadsheet to summarize packouts by variety, calculating an average return for each variety and comparing returns per lot, block or by pick (1st, 2nd, 3rd).

Please check out the NY Fruit website for your production region for an Excel template to summarize the packout statements for your farm by variety. You may decide to design your own spreadsheet. Consider comparing the some or all of the following items:

- Return per bushel or per twenty bu. bin by varietal pick date or by 1st, 2nd or 3rd pick.
- Note pack date which indicates amount of time stored, or market conditions when sold
- Note how each lot packed out: % counts, bags, culls, fresh slices
- Ask your packer to state reasons for culls (size, specific defects: bitterpit, bruise, color)

Once you begin studying your packouts on a regular basis, you can set goals for improving returns by block or variety. Some of those goals may include:

- removing low returning or obsolete varieties
- securing more pickers earlier to pick fruit in a more timely manner
- determining which blocks need to be marketed in the fall as tree ripe fruit
- diverting some blocks to fresh slice or process market designations at harvest
- improving fruit size through multiple chemical thinning applications, earlier hand thinning or installing trickle irrigation
- improving management of pickers to reduce bruising and the number of defects placed in the bin during harvest
- improving fruit size through pruning techniques and/or fruit spur extinction
- changing to planting systems with narrower canopies

There are many ways to increase the profitability of your operation. You need to start somewhere to figure out a baseline and then develop plans or goals to progress from that baseline. Closely examining and comparing the packouts of last year's crop is an excellent place to begin.

How To Get Your Tree Nutrition Right In The 2013 season?

M. Miranda Sazo, Stephen Hoying, Mike Fargione and Lailiang Cheng

Work on apple tree nutrition has shown that (1) fruit harvest removes significant amounts of potassium from the orchard every year, (2) sandy or gravel soils have low potassium supply power, (3) NY soils generally have low potassium levels, and (4) low organic matter leads to low potassium supply. Potassium has the highest concentration in fruit and more than two thirds of the total tree K requirement is found in fruit. Apple trees have a constant demand for potassium from bloom to fruit harvest and about 55 to 60 lbs of potassium is removed at a fruit yield of 1000 bushels/acre. This number increases to about 75 to 80 lbs at a fruit yield of 1500 bushels/acre, which is equivalent to about 100 lbs of K_2O. Therefore, it is critical to have a maintenance program to make up for the K removed from your orchards even if your soil K levels are adequate. In anticipating a heavy crop this year, the trees will need a significant amount of K. If you use regular ground application, put down the K in the spring if you have not applied any K last fall.

There are two windows for regular soil nitrogen application that would fit the tree nitrogen demand pattern: one is from budbreak (early April) to the beginning of rapid shoot growth (late May) and the other is late season when soil N application no longer affects fruit quality (just before or shortly after fruit harvest). Nitrogen applied early in the season contributes directly to rapid leaf area development (both spurs and shoots), fruit set, and fruit growth in the current season while nitrogen applied late in the fall helps to build up nitrogen reserves. Therefore, soil application of nitrogen between budbreak and petal fall is probably the best way to meet the tree nitrogen demand early in the season. For orchard soils in NY and the Northeast, the amount of fertilizer N required is anywhere between 0 and 80 lbs, which would contribute 0 to 30 lbs of actual nitrogen to the trees, assuming the fertilizer uptake efficiency is between 30 to 40%. If more than 40 lbs actual N per acre is to be applied, a split application, half at a couple weeks after budbreak and the other half at petal fall or shortly thereafter, is recommended. Optimum growth of apple trees is associated with leaf nitrogen values of approximately 1.8 to 2.6 percent depending on tree age, type of fruit, and the intended market. For example, rapid growth of young trees is highly desirable for developing the canopy to capture sunlight for promoting early cropping. The optimum leaf N for young apple trees is approximately 2.4 to 2.6 percent. As trees mature, less vegetative growth is desired and the "satisfactory" level of nitrogen is generally reduced to improve color development and fruit firmness. Consider early foliar N spray for fruit set and early fruit growth when leaf analysis shows less than 2.2 percent leaf N the previous year. Foliar N spray can extend the effective pollination period and promote fruit cell division.

Lime and its benefits: Thorough incorporation of adequate amounts of lime prior to planting a new orchard is essential. The topsoil (0-8 inch depth) should be adjusted to pH 7 and subsoil (8-16 inch depth) to pH 6.5. An adequate liming program based on soil tests

should be the first consideration in developing orchard fertilization plans. Lime is the most economical source of calcium and magnesium. Regulation of soil pH through liming is also necessary to achieve optimal response to other nutrient elements.

Placement of lime: Time required for lime to act is influenced by method of placement (i.e. soil contact) and by fineness of the material. In preparing soil before planting a new orchard, maximum benefit is obtained by thoroughly harrowing or rototilling the lime into the surface soil, and then plowing to work it as deeply as possible into the soil. If large quantities of lime are required it should be applied in split applications. Working one-half to two-thirds of the total amount of lime into the soil as indicated above, plus thoroughly harrowing the remainder into the topsoil after plowing, is often suggested as an appropriate method for liming during preplant soil preparation. With some fine-textured soils that require large quantities of lime, application of about two-thirds of the total lime required in such a manner, followed by biennial surface applications of additional lime may be necessary to achieve the desired goal.

Surface applications of lime in established orchards move slowly into the soil and must be considered as long term corrective or maintenance programs. Regularly scheduled applications of lime of 2 tons per acre every two years, as predicted by soil and leaf analysis, represent the best available means of maintaining pH values of 6.0-6.5 and calcium and magnesium supplies in the soil. The type of lime (i.e., calcitic or dolomitic) should be determined by the need for magnesium. In most cases, even if soil magnesium is fairly high, dolomitic lime is suggested for orchards. Dolomitic lime generally has a greater neutralizing value than calcitic lime.

Tree Fruit Nutrition Summary: Fertilizer programs in NY are based on supplying just-enough nutrition to optimize cost and production. Here are some guidelines on fruit nutrition from Steve Hoying, Horticulturalist at Cornell's Hudson Valley Lab.

Determining nitrogen needs of apples is best done using leaf analysis combined with examination of last year's shoot growth and crop. Cornell apple leaf N recommendations are: (1) 2.4-2.6% for young non-bearing apples, (2) 2.2-2.4% for young bearing apples, (3) 1.8-2.2% for mature soft variety types (like Cortland, Honeycrisp, Jonamac and McIntosh), (4) 2.2-2.4% for hard varieties (like Red Delicious, Empire, Gala, Rome).

In the absence of last year's leaf analyses, infer N need based on last year's shoot growth and fruit condition, and on older nutritional analyses: (1) Bearing trees with low N status may have terminal shoot growth less than 8 inches long, and may have produced highly-colored, early-maturing fruit. However, trees that did not receive adequate supplemental irrigation may also show limited shoot growth. (2) Bearing trees with excessive N status have shoot growth over 18" and poorly-colored fruit. (3) Also, consider leaf and soil analyses from 2 or more years ago. Combined with growth observations, older nutritional data will give useful, if not ideal, indications of N needs. Plan to do leaf analyses this year if you find yourself relying on older data. (4) The optimal timing for N application may be green tip through bloom, or a split application at green tip followed by a second between bloom and petal fall. Avoid application of N after shoot growth begins because it may contribute to higher fruit N levels. Another strategy would be to apply N shortly before harvest or right after harvest to provide higher reserve N levels for the next year.

A "standard" fertilizer program for bearing apples where leaf analysis shows no major deficiencies and no deficiency symptoms are visible could include: (1) a soil application of 20-40 lbs of actual N; 50-80 lbs KCL; 2 lbs B, (2) at green tip - 4 lbs C-O-C-S or Kocide per 100 gal, (3) at tight cluster to pink - one spray of 3 lbs. feed grade low biuret Urea plus 1 lb. Solubor per 100 gal, (4) At first cover - foliar spray of Zn-EDTA at label rate, (5) at petal fall, first and second cover - 3 sprays Epsom salts per 100 gal., especially on McIntosh to reduce drop, (6) beginning at 1st or 2nd cover, 3 foliar sprays of 1-2 lbs calcium chloride per 100 gal, (7) during the period of shoot growth - 3 more calcium chloride sprays at 3-4 lbs per 100 gal.; Bitterpit-susceptible varieties should receive 6 or more calcium sprays per season, and (8) after harvest - supplemental potassium as needed; 2-3 tons dolomitic lime every 2-3 years.

Recommended Leaf N Levels for Stone Fruit: (1) 2.4-3.4% for apricots, cherries and plums, (2) Above 3.0% and closer to 4.0% for peaches, (3) The best peaches are produced on pencil-sized one-year old wood. The presence/absence of adequate amounts of such wood is another way to determine how your N fertilizer program should be adjusted.

Stone fruit nutrient needs are similar to apple but have important differences: (1) The common apple orchard broadcast fertilizer mix (1-0-2 of N-P-K plus B) is not recommended for stone fruit. Do not apply higher rates of custom-mixed apple fertilizer blend to stone fruit in

order to meet their higher N needs. (2) Unlike apples, stone fruit do not require a large amount of potassium. Careful analysis of leaf samples is important to judge the amount of potassium needed. In addition, stone fruit are very sensitive to chlorides; the sulfate form should be substituted for the muriate form when large applications of K2O are called for in the leaf analysis. (3) Both excess and deficiency of Boron can reduce fruit quality in stone fruit. Rates of boron for soil application in stone fruit orchards should not exceed 1 lb per acre (equals 1/2 of the rate suggested for apples and pears) unless both soil and leaf analysis results indicated that greater amounts are required.

For more in-depth information on orchard nutrition programs, review the 2013 Cornell Crop and Pest Management Guidelines (Chapter 10: Nutrient Management of Apple Orchards) and your old copy of Orchard Nutrition Management; Bulletin 219 CCE published by Stiles and Reid.

DEC Special Permit Training Class for Non-Certified Applicators and Handlers of Federally Restricted-Use Pesticides

Wayne County, Tuesday, April 9, 2013

Registration Begins at 8:30 am (English)
and at 12:30 pm (Spanish)
English Session - 9:00 am to 12:00 pm
Spanish Session - 1:00 pm to 4:30 pm

Cornell Cooperative Extension Wayne Co.
1581 Rt. 88N, Intersection of Hydesville Rd.
Newark, NY

Orleans County, Wednesday, April 10, 2013

Registration Begins at 8:30 am
English & Spanish sessions
9:00 am to 12:30 pm

Orleans Co. Coop. Ext. Fairgrounds Trolley Bldg.
Rte. 31 between Albion and Medina
Knowlesville, NY

Certified Supervisors are required to attend the first 30 minutes of training!

Note: In Wayne County, supervisors who attend the first 30 minutes of training in the English session do not need to repeat the training in the Spanish session

$20 per DEC Special Permit

DEC Special Permit allows non-certified workers to apply and handle federally restricted use pesticides: The Special Permit does not relieve the responsibility of the certified applicator that supervises these employees, but it does relieve the requirement of "on-site, within voice contact" supervision while federally restricted pesticides are being applied. Several of the **pyrethroid, organophosphate, and carbamate insecticides** such as Warrior, Capture, Diazinon, Lorsban and Lannate, and a few herbicides such as Gramoxone and Atrazine, are federally restricted-use materials.

At Special Permit trainings, we review with non-certified applicators Worker Protection Safety (WPS) handler training and for each federally restricted-use pesticide the potential hazards to non-target species and the environment, and how to prevent the risk of exposure. Trainees also receive a packet with summaries of this information.

A DEC Special Permit is valid for one year and needs to be renewed every year unless the pesticide applicator becomes certified. You must pre-register by April 3!
Registration form on back page!

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

Contents:

DEC Special Permit Training Registration. **You must pre-register by April 3!**

To register: Contact Kim Hazel: 585-798-4265 x26; krh5@cornell.edu or
Mail registration to: Kim Hazel, CCE, 12690 NYS Rt 31, Albion, NY 14411
Or FAX registration to: 585-798-5191, Or call Kim Hazel: 585-798-4265 ext 26
Make check payable to: "Cornell Cooperative Extension"

***Registration form: Please* Check Date and session**

April 9, English AM, Wayne Co. April 9, Spanish PM, Wayne Co. April 10, Orleans Co.

Grower Name (supervising certified pesticide applicator) _____

Farm Name _____ DEC Applicator ID# _____

Farm Address _____

Names of non-certified applicators attending: $20 each, choose session

_____ Eng □ Span □

_____ Eng □ Span □

_____ Eng □ Span □

_____ Eng □ Span □

_____ Eng □ Span □

Number attending _____ x $20 = _____ total submitted