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Tree Fruit News

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Regional Updates*:

North Country—Clinton, Essex, northern Warren and Washington counties

Tree phenology: Apple=harvest.

Current growing degree days 1/1/13 to 10/7/13	Base 43°F*	Base 50°F*
Chazy	3578	2408
Peru	3616	2468
South Hero, VT	3813	2629
Willsboro, NY	3591	2420
Shoreham, VT	3815	2648

Pest focus—Apple: scab, sooty blotch, flyspeck, fruit rots.

Capital District—Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, southern Warren and Washington counties

Tree phenology: Apple=harvest.

Current growing degree days 1/1/13 to 10/7/13	Base 43°F*	Base 50°F*
Granville	3592	2453
North Easton	3909	2710
Clifton Park	3800	2632
Guilderland	3864	2687

Pest focus—Apple: scab, sooty blotch, flyspeck, fruit rots.

Mid-Hudson Valley—Columbia, Dutchess, Greene, Orange, Sullivan and Ulster counties

Tree phenology: Apple=harvest.

Current growing degree days 1/1/13 to 10/7/13	Base 43°F*	Base 50°F*
Hudson	4169	2965
Highland	4214	2966
Marlboro	4125	2890
Montgomery	4102	2890

Pest focus—Apple: scab, sooty blotch, flyspeck, fruit rots, brown marmorated stink bugs.

Expected Harvest Timing

Region	Week of 10/7/13	Week of 10/14/13
North Country	(McIntosh, Honeycrisp, Cortland) +Retain;	Completed;
Capitol District	(Empire, Red Delicious, Golden Delicious) ± Retain	(Empire, Red Delicious) + Retain;
Mid-Hudson	(Empire, Red Delicious, Golden Delicious Jonagold) + Retain;	Law Rome, Fuji, Idared, Cameo, Staymen

**All degree day data presented are BE (Baskerviile-Emin) calculations.*

Serving the educational and research needs of the commercial small fruit, vegetable and tree fruit industries in Albany, Clinton, Columbia, Dutchess, Essex, Fulton, Greene, Montgomery, Orange, Rensselaer, Saratoga, Schoharie, Schenectady, Sullivan, Ulster, Warren and Washington Counties

Viable Dwarf Trees Always Require Integrated (Trellis) Support – Always

By Kevin Iungerman, ENYCH

Virtually all apple growers in the region have made the transition from freestanding, semi-vigorous or semi-dwarf trees to at least representative plantings on fully dwarfing rootstocks. Today, many growers have only representative remnant plantings of their older, lower density orchard.

A casual orchard visitor at, or close to harvest, is unlikely to miss the striking difference of crop load mass relative to tree structural mass as exists between the smaller, fully dwarfed trees, comparable to larger semi-vigorous or even fuller-sized and seedling trees. It has been a progression of ascendant crop and diminishing inherent aerial and subterranean structural components. This changed reality is of course a desirable outcome: to grow more fruit and less wood. But with gains there are also risks.

Even where orchards are well along this transition by a couple of decades, it is still essential to realize what has been wrought: the ratio of transient crop to permanent tree structure has fundamentally changed; we need to fully appreciate the shifted parameters of mass, gravity, and stress forces that have increased along with the new growing environment, including those aspects related to soil and atmosphere (i.e. wind, precipitation, heat).

We need to be mindful of what I think of as the orchard's underlying performance physics and the collateral consequence of increasing the fruit to wood ratio in achieving the pedestrian orchard. We have accentuated the need for an artificial exoskeleton to supplant much of the diminished tree, if we are to provide the supportive carrying capacity for the fruit. Much the same can be said with regard to the diminished root extent and consequent capacities for water and nutrient provision for the dramatically increased fruit levels per acre.

Hence the need for trellis certainly, and less recognized perhaps, also irrigation and fertilization management. We will see increasingly greater need to address these latter "subterranean" concerns as climate progressively warms in coming years, and in tandem, evapotranspiration steps up. (July 2013 was an instructional case in point in this latter regard.)

Because dwarf rootstocks produce relatively shallow, and even brittle root systems relative to larger trees, the interplay of dynamic environmental forces will - in the absence of adequate supplemental support - surely facilitate the complete toppling, uprooting, or "miscanter" of trees in the instance not only of severe storms (as was seen in 2009) but lesser gales. I have a note from an Applecrop discussion (11/13/08) where a Colts Neck, New Jersey grower lamented that even "minor storms with winds up to 40 MPH required subsequent straightening and re-staking (of) around 50 trees each time" of their individually wooden staked M26 trees."

Example of Trellis Failure due to Wind, Wet Soil, Insufficient Support. Tropical Storm Irene, Peru, 2011. *Photo: K. Iungerman*

Like a few growers here still, this NJ grower greatly disliked the idea of a full trellis system – "the expense, (the) installation problems, and (the) pick-your-own accessibility issues". Yet he wanted a pedestrian orchard just 10 miles from the Jersey shore and admittedly he was worried about "… a heavy fruit load … and hurricane winds, say, 75 MPH". (This was prior to the Northeast's recent rounds of Irene, Lee, and Hurricane Sandy!)

In my view, a suitably interlinked framework of in-line vertical and horizontal supports, together with supplemental water management and good site selection (i.e. functional tiling; grade and soil series considerations; irrigation and fertigation capacity) has to be provided for all dwarfing orchards; let's be clear that there is no such thing as a free-standing or individually supported dwarf tree (*at least not for long*).

Gravity, constant and variable wind, soil shrink-swell forces, and annual frost-heave-cycles will compromise the integrity of all unaided and/or singly supported crop-bearing dwarf trees; without in-line runs of high tensile wire affixed to trees and to suitably spaced in line posts, the bearing canopy of dwarf trees will otherwise cause the trees to lean, lead to limb and/or trunk breakage over time, and prompt recovery costs that can compromise and even prevent investment recovery. Insufficiently supported high-density dwarfing orchards are literally lost-leaders.

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Viable Dwarf Trees and Trellis Support, continued from page 2

High density plantings absolutely require attention to early procumbent training and / or limb renewal pruning (the extent depending on system) to foster completely uniform light penetration into the structure; achieving this objective avoids what too frequently happens: the upward creep to a "tree-top-crop". When such a crop disparity occurs, increased gravitational and atmospheric stresses intensify and can exceed supportive structures of tree and trellis and the orchard's coping capacity. Much like pipetting an unknown solution to its indicative pH color shift point, the tipping point of tree-top-crops, can unfortunately, be equally sudden and dramatic.

This is because the crescive shift of mass and surface area higher in the tree goes somewhat unnoticed until the greater stresses of gravity, wind shear, and vibrational shimmying of vertical uprights bring abrupt support failure. (This is true no matter the soil type, though especially so, in heavier and wetter soils.) Vertical creep also brings more upper canopy shading of current-season lower fruit, compromising quality and value; and it impairs healthy, strong fruit bud formation for the forward year.

A supportive framework includes 8 – 10 foot-long, half-inch to three-quarter-inch diameter conduit pipes secured to each tree and also tied to a 13 gauge high tensile wire 8 feet above ground. The wire is supported by 10-foot to 12-foot-long, 4" thick wood posts, spaced no more than 35 feet apart in the row. Bamboo poles are less expensive than conduit, but they weather and will be biologically compromised (rot) and weakened and will most assuredly split and break sooner than 8 years - much sooner should severe weather come through. (Use as interim per tree training supports affixed to multiple horizontal wires is OK but more expensive than wire – see below.)

Cultivars with brittle wood, such as 'Gala', may break at the bud union when a single wire is used. A less expensive alternative to the conduit single-wire approach involves securing the trees to 3 (or even 4) wires spaced vertically about 3 feet apart, starting about 3 feet above ground, which are crimpled together with vertical wire stents to form a wire trellis system attached to the in line and end posts.

More information about support systems can be found in the still excellent publication "Support Systems for High Density Orchards" by Dalfsen et. al., British Columbia Ministry of Agriculture, 1986, which is available as a PDF download at: http://www.al.gov.bc.ca/resmgmt/publist/300Series/336000-1.pdf

Fact sheets on tall spindle, vertical axis, and slender axis systems are available online at www.fruit.cornell.edu: specific links are, respectively:

- http://www.fruit.cornell.edu/tree_fruit/resources/The%20Tall%20Spindle%20Planting%20System.pdf
- http://www.fruit.cornell.edu/tree_fruit/resources/The%20Vertical%20Axis%20Planting%20System.pdf
- http://www.fruit.cornell.edu/tree_fruit/resources/The%20Slender%20Axis%20System.pdf

Finding Your Orchard Density Sweet Spot

Robinson, Hoying, Miranda, DeMarree, Dominguez, Cornell Dept. Horticulture. Adapted by Kevin Iungerman, ENYCH.

We have seen great progression in orchard tree densities among regional plantings, and though some operations continue with 200 or fewer trees per acre, others have pushed the upper envelope to 1200 or more trees per acre. For the past dozen years or so, Dr. Terence Robinson has led, and Cornell and Cornell Extension colleagues and NY grower cooperators have collaborated on, several extensive systems trials over a range of tree densities, with an analysis of yields, costs, and especially, profitability. (As one example, my final harvest with the Systems trial at Everett Orchards, Peru, comes upon 12 years of performance, stretching the generic 10-year trial timeline.)

Five common systems spanning tree densities of 340 - 2,200 trees per acre have been (and continue to be) examined in the several trials: the Slender Pyramid, the Vertical Axis, Slender Axis, Tall Spindle, and Super Spindle. As one might expect, the greater the planting density, the greater the investment cost of orchard establishment - but at the same time, the realization of greater early yield and higher cumulative yield of the higher density systems, has generally resulted in increased profitability up to that proverbial "point".

When yield data was interpreted through the economic lenses of Net Present Value Analysis over 20 years (using NPVA on the basis of two approaches: per unit of capital invested and per unit of land area) the most economically viable planting densities were about 1,000 trees per acre (950 with NPVA-capital; 1,050 with NPVA-land).

Although better nursery tree quality and improved early tree management practices improved NPV in terms of significance difference, the optimal "point" shifted to 1100 trees (presumably based on NPVA-land). The greatest risk variable to this rosier economic scenario is not severe weather as one might expect; rather, it is the fruit's selling price that most impacts the potential profit of each planting system.

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For instance, all systems were found to be profitable at fruit prices of $0.14/lb. ($0.30/kg) (not including packing, storage, marketing costs). If fruit prices were to decline by 0.03/lb. ($0.05/kg) all of the systems became *unprofitable*. On the other hand, if significantly greater price could be achieved, as for instance with very high quality, high demand varieties, or with supply-constrained club selections, the gain-capture response of the different systems dramatically separates; while all would understandably be more profitable at an even higher prices of say $0.25/lb. ($0.55/kg), the profitability gain for the highest density system would be on the order of 9-fold!

Tree purchase price and trellis costs also influence profitability greatly. At low densities, tree prices had small effects, but correspondingly greater impact at higher prices. So with high tree prices, profitability of all systems was low, and optimal numbers were on the order of 1,000 trees/acre (2400/ha). Conversely, as tree price dropped, the profitability of each system increased, as did optimal density.

It appears to be a standard economic given: a co-traveler to higher gain is the phenomena of greater risk; as higher density systems post the greater gains upon better fruit prices (and lower tree prices), under lower fruit prices (or higher tree costs) they also drop the most.

The question of course is: How much exposure should your orchard portfolio present? I hear-ya! It makes sense to pay attention to the volatility potential and to locate the sweeter spot that commands the longer view; that spot appears to be at 1,000 – 1300 trees/acre (2450 – 3,120/ha); based on the system's research, this is the density "point" that should provide the best economic margin long term, one that can even weather the periodic (or even persistent) low price moments of market fluctuations. And of the several higher density systems, the Tall Spindle approach has the nod as being the best disposed to deliver on these expectations. (See Tall Spindle article this issue.)

Source: "Apple Orchard Systems of the Future", by Terence Robinson, Steve Hoying, Mario Miranda, Alison DeMarree, and Leo Dominguez, Summit Proceedings, Eastern Apple Precision Orchard Management Workshop, Geneva, NY, March 14-15, 2013.

The Tall Spindle: Best Positioned New Planting System for Today and Tomorrow

Robinson, Hoying, Miranda, DeMarree, Dominguez, Cornell Dept. Horticulture. Adapted by Kevin Iungerman, ENYCH.

The Tall Spindle System is an amalgamation: it embraces high tree densities of ~1,000-1,300 trees/acre, positioning it below the numbers of the Super Spindle but above those of the Slender Spindle. The tree height is similar to Vertical Axis trees but canopies are narrower, like the Super Spindle. The Tall Spindle system also adopts the highly feathered trees and the pendant limb training of the solaxe. Minimal pruning occurs in the first 3 years and in contrast to the slender spindle and tall spindle systems the leader remains untouched – it is not pruned in training. At maturity, this system will have a dominant central trunk without any permanent scaffolds; this is ensured through limb renewal pruning when limb diameters become too large (> 0.75" [2 cm]).

Tall Spindle orchards can vary from 1,452 trees/acre (3x10 ft.) to a low of 908 trees/acre (4 x 12 ft.) and is to be governed by the end-interplay of cultivar, tree caliper quality, rootstock vigor, and soil strength.

Honeycrisp, Snapdragon, Delicious and other weak or moderate growing cultivars, such as Empire, Jonamac, Macoun, Idared, Gals, NY674, Golden Delicious, etc., ought to have an in-row spacing of 3 ft..

Vigorous varieties such as McIntosh, Spartan, Fuji, Jonagold, Mutsu, etc. – and also tip-bearing varieties like Cortland, Rome Beauty, Granny Smith, and Gingergold – should be more along the lines of 3.3-4 ft. in-row. Between row spacing of 11-12 ft. on level ground is desirable for all, a bit more (12-13 ft.) on slopes.

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Hi-Density Lends Itself to Mechanized Adaptation. Peru Systems Trial, 2013. *Photo: Kevin Iungerman*

The Tall Spindle Planting System, continued from page 4

Dwarfing rootstocks like M.9, and B.9, or the fireblight resistant Geneva stocks (G.11, G41 and G.935) have worked well in Tall Spindle plantings. In situations of vigorous varieties on virgin soils, weaker rootstocks such as M.9NAK, BT 337, M.9Fluerens 56, B.9, G.11 and G.41 are especially suited. In situations of replant sites or weak scions, it is preferable to use the more vigorous rootstocks like M.9, Pajam2, M.9 Nic29, M.9EMLA, or G.935.

Highly-feathered (branched) nursery trees are essential to the Tall Spindle System. Whips or small caliper trees effectively delay fruiting until years 4 or 5, meaning that the extremely high front-end investment costs have to be carried longer, and denies early sales that otherwise would begin servicing this debt. Consequently, the potential profitability benefit of the higher density over lesser densities can be frustrated and even completely negated. Dr. Terence Robinson's ideal nursery tree will have a minimum caliper of 5/8", possess 10-15 well-positioned feathers no longer than 12", and no lower than 28" of tree height. While this standard is becoming more available it is often hard to come by presently.

Unlike the more traditional Vertical Axis and Slender Spindle systems, the Tall Spindle is distinguished in its absence of lower tier permanent branches. Here, all of the feathers are tied or weighted below horizontal at planting to induce cropping and to encourage weak fruiting branches versus substantial scaffold development. (With Vertical Axis and Slender Spindle, pendant tying is slightly above horizontal precisely to permit scaffold development over the tree's first 4 years.) No further tying of new branches arising from the trunk require tying as these most often bend below horizontal due to crop load.

Failure to tie down the feathers as indicated can kickoff an unfortunate cycle: strong lower scaffolds can form; severe limb remedial removal pruning becomes required (because of spacing); the pruning invigorates the tree; and vegetative response compromises fruiting! Attention to this detail means that little or no pruning will be required for the first 5-8 years of the plantings life.

With orchards upon precocious dwarfing rootstock, growers need to be watchful of potential overset in the 2nd or 3rd year which could set off repetitive rounds of biennial bearing and vegetative growth in some varieties just as trees should be filling their space and vigor diminishing. Gala and other annually cropping varieties may be allowed 20-40 apples/tree in the second year, and 60-100 in the third; for biennial bearing apples like Honeycrisp, or slow growing varieties, crop loads should be half the targeted amount for Gala.

Adapted from "Apple Orchard Systems of the Future", Terence Robinson, Steve Hoying, Mario Miranda, Alison DeMarree, and Leo Dominguez, Summit Proceedings, Eastern Apple Precision Orchard Management Workshop, Geneva, NY, March 14-15, 2013.

Managing Wildlife Damage after Harvest in Commercial Fruit Plantings

By Mike Fargione, and edited by Kevin Iungerman, ENYCH

Local deer, rabbit, or vole (field mice) may cause severe dormant season feeding damage to fruit plantings when natural foods become scarce. Fall is a critical season to initiate preventive action to limit wildlife damage and the following information can guide these efforts:

White-tailed Deer:

- Damage usually consists of browsing (feeding) upon fruit, twigs, and buds, and also bark removal by bucks rubbing their antlers on trees. Deer browsing, unlike other herbivore feeding, evidences ripped or jagged appearances at branch ends.
- Scare devices provide limited or no control of deer damage. Don't waste your time on these unless for a few days interim use while other measures are put in place.
- Repellents are effective when deer pressure is light to moderate. Effective, scientifically tested products usually contain soap- or egg-based formulation plus a sticker. For greatest benefit, begin an early fall application prior to any damage

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White Tail eating tree branches.

Photo by Justin W. Moore, Study of Northern Virginia Ecology, Fairfax County Public Schools. http://www.fcps.edu/islandcreekes/ecology/white-tailed_deer.htm

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onset; follow with another application as late as weather permits, and then a third if a mid-winter thaw allows. Apply on sunny days with temperatures above freezing to allow complete drying. Remember, repellent programs and or/conditions often fail to completely eliminate damage.

- Physical barriers present the most effective deer deterrent. Single and multi-wire electric fence arrangements have been evaluated (with and without attractants or repellents). In my experience, all electric designs eventually fail due to poor design or construction, inadequate maintenance, weather conditions (dry ground or snow cover) – any of which can reduce animal shock upon touch. Many Eastern NY apple growers now routinely construct 8' tall high tensile, woven wire perimeter exclusion fences; prorated over 30+ year life expectancies, these fences are the cheapest and most effective deer deterrent. Tall plastic-mesh tall fences (7-8') have gained some popularity because of lower up-front cost, yet their shorter life expectancy and increased maintenance needs likely belie any perceived savings.
- Some growers have had good luck using confined-area, free roaming dogs to reduce deer presence. Although electrical "pet containment" systems are effective and are relatively cheap to install, the systems – especially the canine components! – have large maintenance requirements over time that render them unattractive.
- No prior solution addresses root issues of too many deer for local land husbandry. Farmers should initiate a controlled hunting program - where feasible - to cull adult female deer to bolster all exclusionary techniques and so reduce deer populations and crop damage.

White-Tailed Deer buck rubbing its antlers on a tree, North America. *Photo: Tom Edwards; http://www.allposters.com/-sp/White-Tailed-Deer-Buck-Rubbing-its-Antlers-on-a-Tree-Odocoileus-Virginianus-North-America-Posters_i6012609_.htm*

- Managed hunting involves instructing hunters when, where, and how they can hunt. Allow future access only if they remove adult female deer. The NYS DEC provides the means to legally harvest antlerless deer through their DMU permit and DMAP programs, respectively: http://www.dec.ny.gov/outdoor/6403.html and http://www.dec.ny.gov/animals/33973.html. DEC may also issue damage permits directly to farmers outside of the deer season, but damage must already be evidenced. Contact your local DEC office for more information at http://www.dec.ny.gov/about/558.html.

Voles (field mice) including Meadow Voles and Pine Voles:

- Vole (mouse) populations quickly increase under favorable conditions (infrequent mowing and wet seasons). Damage involves feeding on the bark above (*primarily meadow voles*) or below ground level (*primarily pine voles*). Feeding that mostly or completely encircles the stem (girdling) can cause plant death in the subsequent growing season. (Lesser degrees of injury can mimic other decline-dynamics, such as root rots or borers.)
- The reduction of protective cover is the primary cultural control method for voles. Late fall close mowing of row middles and perimeter surroundings reduces vole habitat, improves baiting success, and increases natural predation rates. A clean herbicide strip assists this. Windfall fruit, prunings and other debris should be removed.
- Wire and plastic tree guards have fallen from favor, particularly in new high-density orchards where 1,000 -2,000 trees per acre are being planted. When used, be sure the bottom edges of guards are buried slightly below the soil line. Mice do chew through plastic guards.
- Post-harvest rodenticide applications can offer useful second stage orchard mouse control. Pelletized baits may be most effective, and unlike corn or oat whole grain baits, they are less likely to be consumed by non -target species such as quail, grouse, or turkeys. Not all sites will need treatment - scout first. Apply rodenticides as grass begins to die back (November), after several days of clear, dry weather, but before snow cover, to improve rodent bait taking.
- Zinc phosphide-treated baits are currently legal for post-harvest use in NY commercial pome, stone, grape, bushberry, caneberry and nut plantings. Zinc

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Managing Wildlife Damage after Harvest, continued from p. 6

phosphide baits can be broadcast by hand or machine. It is illegal to have bait accumulate in piles or land on bare ground. Bait stations - PVC tubes, split tires, or beneath shingles - work well and avoid such problems.

- Rozol is also labeled in NY for post-harvest pome fruit and stone fruit use but not in other fruit plantings. Rozol cannot be broadcast; it must be used in bait stations or placed directly into a vole tunnel (useful with pine voles). (As Rozol is an anticoagulant, it poses in my view, an unacceptable risk to raptors secondarily feeding upon poisoned but still mobile rodents. K. Iungerman.) Regardless of bait, whenever possible, bait station use is preferred where game birds frequent. Always read product labels for additional restrictions before use.

Rabbits:

- Rabbit feeding on twigs can be distinguished by its low height above the ground and its smooth angular cut (not jagged like deer). Rabbit trunk girdling shows larger, distinct tooth marks on the exposed wood whereas vole feeding leaves almost a smooth wood surface.
- The most effective means of reducing rabbit populations and damage is to mow and remove cover in and around the planting. Regular season hunting effectively reduces damage. Live trapping can be used, but NYS conservation law requires animals to be euthanized or to be released onto the same property but never released elsewhere.
- Physical barriers such as individual guards or low fencing must be at least 2' taller than the maximum snow depth in order to be effective.

Game animals, which cause damage or are in excess numbers, may be taken during their specified hunting or trapping seasons with the appropriate NY sporting license. Some wildlife species can be killed out of season without a permit if they are causing damage. Permits are required to take deer, bear, beaver and many bird species. Contact your local DEC office (http://www.dec.ny.gov/about/558.html) or visit http://www.dec.ny.gov/animals/81531.html for more information on dealing with nuisance animals.

October Urea Sprays and Mowing to Reduce 2013 Scab Carryover

By Kevin Iungerman, ENYCH

Early October represents an opportune time for furthering apple scab control by the simple tactics of running your flail mower through the orchard and/or applying foliar urea applications, to reduce inoculum carryover in leaf litter. Granted, these approaches will never achieve a 100% degradation of the leaf matter but the approaches can greatly reduce next year's spore load by 50% and even 80% from what it will otherwise be – and 2013 has been a bumper "seed year". There is an added benefit to this fall strategy too, as it impacts fungicide-resistant and fungicide -sensitive apple scab isolates equally; so you will be destroying considerable numbers of scab isolate that are resistant either to strobilurin fungicides or sterol inhibitor fungicides as well as the sensitive ones. This article recaps how to best carry out one or all of the following inoculant-reduction practices:

- Late fall foliar urea applications
- Fall ground urea applications to fallen leaves
- Shredding of leaf litter with a flail mower

Foliar Application to Leaves in Late Fall:

Michigan research illustrated the benefits of utilizing a 5 percent solution of urea spray or greenhouse grade urea to increase the breakdown of leaves. The urea is used at a rate of 40 lbs. in 100 gallons of water per acre. Dr. Dave Rosenberger of Cornell's Hudson Valley believes that if the amount of water/A was somewhat more or less than 100 gal/A this would be OK provided that the full rate of urea is applied per acre. Food-grade urea will dissolve more easily than fertilizer-grade urea, but either one will be effective against scab.

It is considered to be more effective to wait until leaf-fall and to then apply the urea to the downed leaves rather than spraying the leaves while still on the trees. Why? Because timing can be quite tricky.

One might think that good leaf condition and retention should give better uptake and effectiveness; not so. It turns out that if the leaves are still physiologically active at the time of a foliar application, and if they do not then drop within seven days, the tree's axial buds will draw off the nitrogen of the urea from the leaves. While this will not impair winter hardiness and it will serve to boost early spring bud development, it will deplete the nitrogen load in the leaves and hamper accelerated leaf degradation following detachment.

Normal seasonal temperature changes do complicate the clear choice of options; outright hard fall freezes can of course complicate matters. In general, the longer one can delay the application, the more effective the urea action

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Urea Sprays and Mowing - Reduce Scab Carryover, continued from page 7

will be against scab – though of course there are limits. But do not be overly guided by what is happening in the woodlot beyond the orchard. Maintained orchards do not behave as typical deciduous trees of field and forest. Casual observation will demonstrate how fertilized and maintained orchards carry their foliage quite long relative to wild trees, and oftentimes, we have seen how an early hard freeze can prolong an apple leaf's attachment dramatically.

Still, ambient ground temperature must be favorable, and of sufficient duration, to allow indigenous microbes and earthworms to be our agents of leaf destruction. While urea can soften leaves for easier ingestion by earthworms, if overlay cold conditions abruptly arrive the critters retreat into the soil and leaf ingestion ceases. So while optimal timing is uncertain, Dave suggests that you make your fall urea applications by – and no earlier than - late October (unless you think that more than 50% of leaves will be on the ground by that time). Ideally, one would like to have the applications made within 7-14 days of leaf drop.

What happens if you get busy and miss the late October window? You're in luck – you get a second chance, a spring application!

Spring ground applications of urea to leaf litter:

The several uncertainties of fall application are the reasons some prefer to hold the ground urea applications to leaves till the spring, when biological activity is rising, and the timing may be more effective in achieving leaf degradation and reduced spore counts. Also at that timing, the urea likely inhibits ascospore formation in surviving structures. But spring has liabilities too; as we know, snow and /or wet spring conditions can render spring timing less favorable than fall.

Now, fall flail mowing of leaf litter:

Shredding leaf litter in the fall carries some of the same uncertainty of timing as urea applications – and also can be done in the spring. Fall mowing increases microbial breakdown of leaves prior to winter as it provides more pieces that can be invaded and consumed by our biological friends. If left undisturbed, scab pseudothecia structures in leaf litter will eventually develop the following spring – and not before. All of these pseudothecia structures will be oriented in a vertical direction with openings facing up. When optimal conditions prevail, mature spores will be forcibly ejected out of the top of the pseudothecium and into the air to be carried hither and yon.

Mowing in fall will not directly destroy pseudothecium but will prevent more leaf litter from surviving to host pseudothecium formation. Spring mowing will turn leaf litter topsy-turvy, so many leaf pieces containing a pseudothecium are more likely to be ejected into the soil rather than into the air, cutting the infection cycle potential of those particular leaf pieces. You do not get this reorientation benefit in the fall, because pseudothecia are not yet formed.

Your choice then: mow in the fall and facilitate leaf decomposition and greatly diminish the end numbers of potential pseudothecia; or mow in the spring when more pseudothecia will be present, but expect that physically reorienting a good percentage of the pseudothecia, along with leaf degradation from urea and heightened soil organisms action (with improving ground temperatures) will be a suitable strategy.

But as with spring urea applications, mowing will require suitable field conditions to be present, which will allow you to get in there to mow. In sum, it seems to me - if it can be done - that a combination of fall foliar applications and then flail mowing seem an approach with greater certainty of being carried out and thus the preferred approach.

A few other points about mowing:

- The mower must be set low enough to reach leaves low to the floor.
- The mower must also be offset to reach leaves beneath the trees.
- (And a note here concerning any fallen leaf urea application in the spring: this nitrogen will add to the overall nitrogen fertilization of the affected trees so subsequent N fertilization rates should be adjusted accordingly. In late fall, most of the nitrogen not taken up in the fallen leaves will likely leach out of the soil profile).

Revision of "Late October Urea Sprays & Mowing to Decrease Scab Carryover", Iungerman, Northeast Tree Fruit, October 2012. Adapted from "Reduction of Overwintering Inoculum in Orchards with Apple Scab Cultural Controls: Reducing Apple Scab-Infected Leaf Litter Prepares the Orchard for More Effective Control Next Year", George W. Sundin, Amy Irish-Brown, Michigan State University Extension News for Agriculture, Sept. 9, 2011; and email information from Dr. Dave Rosenberger, Cornell NYSAES Hudson Valley Lab to Kevin Iungerman, 10/5/11.

Adieu! Iungerman Departing Cornell for Minnesota and Points Unknown

By Kevin Iungerman, ENYCH

All research plots (apples and grapes) came in by September's end with nary a drop of rain in contrast to other wetter years - a wonderful harvest season.

This Tree Fruit News marks one among my dwindling assignments, as I look to wrap up remaining tasks in coming weeks and my departure from Cornell by mid-November after some 20 plus years as an Extension "fruit agent". (I always preferred that older terminology and now more appropriately so!)

Officially "retiring", I will undoubtedly be pursuing as yet unexplored paths and further gainful employment as I rejoin my spouse and daughter in MN.

I have enjoyed working with many of you over the years and seeing - and in cases assisting - your orchard, small fruit, and vineyard enterprises. I hope I will cross paths with many prior to my departure.

I will miss the Adirondack and Champlain terrain I have come to love so much and I look forward to returning to the region now-and-again to see how everything is turning out. Should you wish to reach me, I will continue to be available via the same kai3@cornell.edu (a perk!).

Best Regards, Kevin Iungerman

Final 2013 Fruit Field Research Plot Harvest - Iungerman with Willsboro Grape Volunteers 9/28/13. *Photo by Kevin Iungerman.*