Fruit Notes

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Fruit Notes

Editors: Wesley R. Autio & Winfred P. Cowgill, Jr.

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Correspondence should be sent to:

Fruit Notes
Stockbridge School of Agriculture
205 Bowditch Hall
University of Massachusetts Amherst
Amherst, MA 01003

Table of Contents

Cover: Enhancing branching of apple nursery trees with Maxcel at Adams County Nursery, Milton, DE. Photo was taken 2 weeks after treatment of the growing point of leader. Notice young shoot developing in leaf axils. Win Cowgill photo.

An Update on Thinning Peaches with Gibberellic Acid

Wesley Autio and James Krupa
Stockbridge School of Agriculture, University of Massachusetts

Winfred Cowgill, Rebecca Magron, and Suzanne Sollner-Figler
New Jersey Agricultural Experiment Station, Rutgers Cooperative Extension

Hand thinning of young peach fruit is an expensive part of peach production. Any technique that could reduce the labor of thinning would be financially beneficial to peach producers. In 2012, we reported on 2 years of work with gibberellic acid (GA) on peaches. GA was applied about 4 weeks before harvest. Work elsewhere suggested that GA applied in this pre-harvest period can reduce flower bud formation. Our results confirmed those with significant reductions in flower bud formation with increasing concentration of GA. Further, GA application increased flesh firmness in the year of application.

In 2013, our goal was to again test the effectiveness of GA application on fruit quality and firmness and to study the potential interacting effects of AVG (Retain®).

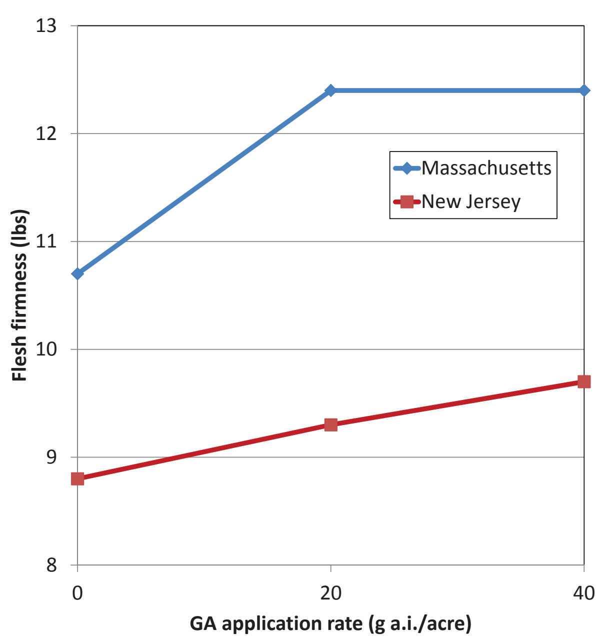


Figure 1. Effects of GA applied two weeks before harvest on flesh firmness of Jersey peach in Massachusetts and New Jersey.

Materials & Methods

In 2013, 78 and 48 trees were selected at the Rutgers Snyder Farm (Pittstown, NJ) and at the UMass Cold Spring Orchard (Belchertown, MA), respectively. Trees were divided randomly among three rates of GA in the form of ProGibb® (0, 20, and 40 g a.i./acre) in all combinations with two rates of AVG in the form of Retain (0 and 50 g a.i./acre). All treatments were applied about 2 weeks before harvest and included 6.4 oz. Sylwet® plus 6 oz. Drexel Defoamer®/100 gallons. Harvest samples were taken on August 15 and 22 in Massachusetts and on August 5, 9, and 14 in New Jersey. At harvest fruit were weighed, flesh firmness was measured with a penetrometer, and the soluble solids concentration of the juice was measured with a hand refractometer. The density of bloom was measured in 2014 by counting the number of flowers on 6 new 1-year-old shoots of similar vigor per tree (reported as the average number of flowers per cm of shoot length).

Results

AVG resulted in an increase in flesh firmness in both Massachusetts and New Jersey (0.5-1.0 lbs) but did not impact any other measurement and did not substantially affect the fruit or tree response to GA (data not shown). GA increased flesh firmness by about 1 lb in New Jersey and almost 2 lbs in Massachusetts (Figure 1). In Massachusetts, GA decreased soluble solids concentration, but it did not impact soluble solids in New Jersey (Figure 2). Flower bud formation was not affected in New Jersey, but in Massachusetts, the 20g rate of GA reduced 2014 bloom by 38%, and the 40g

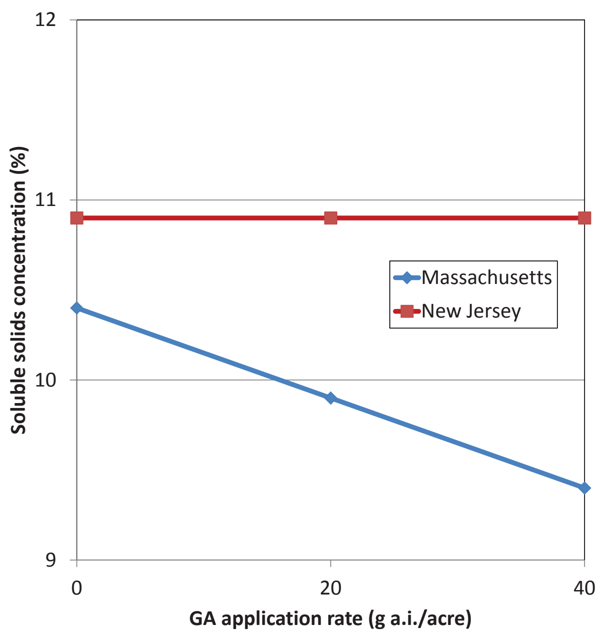


Figure 2. Effects of GA applied two weeks before harvest on soluble solids of Jersey peach in Massachusetts and New Jersey.

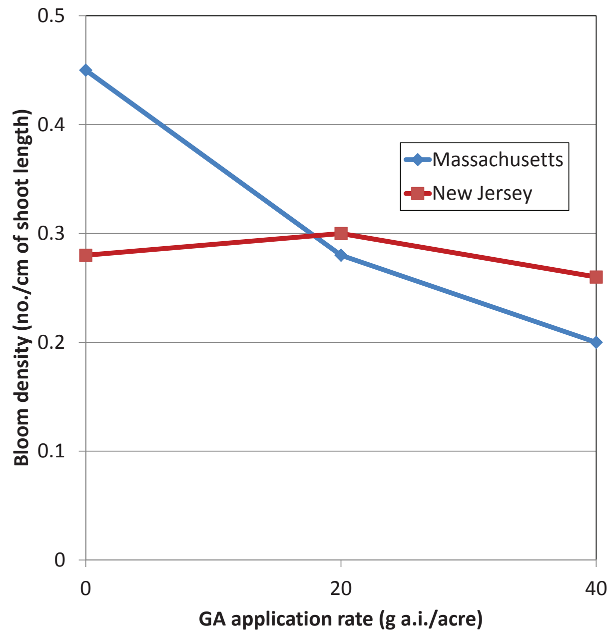


Figure 3. Effects of GA applied two weeks before harvest on bloom density of Jersey peach the following year in Massachusetts and New Jersey.

rate reduced it by 57% (Figure 3).

Conclusions

Increased firmness as a result of GA application has been a consistent result from our research, and it appears that AVG, likewise can increase firmness. For flower buds, the GA effect of reduced formation only was measurable in Massachusetts in 2014. This is somewhat inconsistent, but in the two previous studies, like this one, the flower density of the untreated trees was lower and the response to GA was less pronounced in New Jersey than Massachusetts. We believe that the higher vigor of the New Jersey trees may be affecting their responsiveness to GA applications.

In three years in Massachusetts and two out of three years in New Jersey, GA application 2-4 weeks before harvest significantly reduced flower bud formation and the resulting flower density. GA can therefore significantly impact the need for hand thinning.

We recommend that growers test GA on their farms with trees of different vigor and of different varieties. A rate between 20 and 32 (the maximum label rate) g a.i. per acre and timing of 2 weeks before harvest is a good starting point. We believe that GA, once calibrated for a farm, can be a valuable tool for a peach grower.

Monitoring and Management of the Brown Marmorated Stink Bug: Edge Effects and Relation to Control Tactics

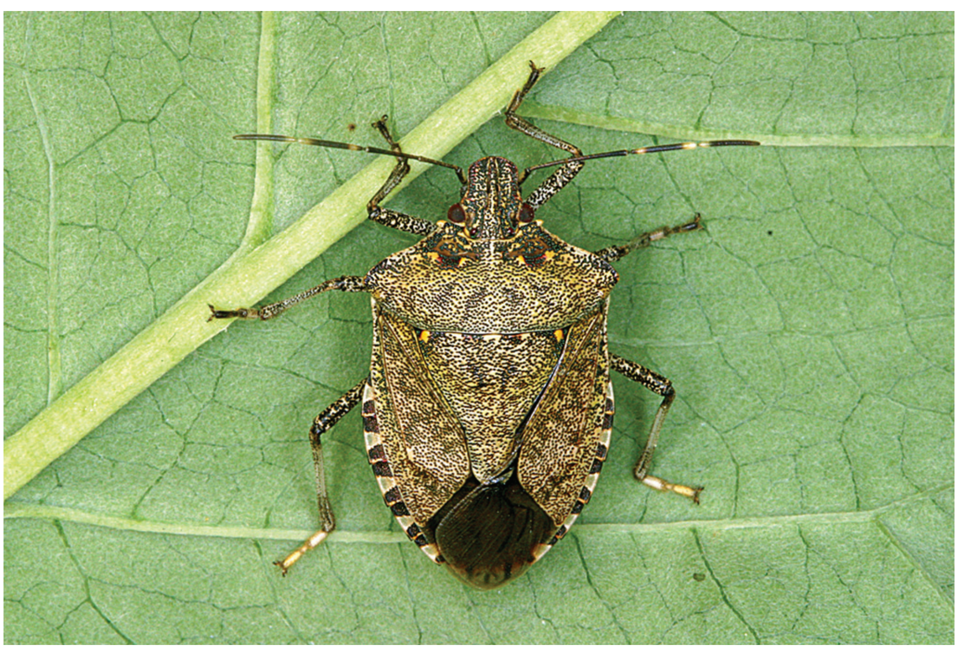
Dean Polk
Rutgers Cooperative Extension

The invasive brown marmorated stink bug (BMSB) has developed into a key orchard pest that requires routine and regular targeted insecticides in most orchards in the mid-Atlantic area. After the watershed year of high populations and resulting damage in 2010, populations were lower in 2011 and 2012 throughout New Jersey. In 2013 BMSB populations were again problematic at significant levels on a number of farms that required increased use of insecticides.

There are 3 factors that make BMSB particularly challenging for orchardists. First, BMSB has a wide host range, and is a strong flier with strong dispersal behavior. Secondly, it feeds in virtually all life stages in the orchard. Third, once fruit is visibly fed on, it becomes unmarketable as fresh fruit. Apples will sustain some internal damage which increases in storage, and which is not immediately apparent at harvest. Peaches will also have some internal damage not immediately apparent, but most of the market impact is from external damage immediately visible at harvest.

BMSB has well over 300 hosts, and readily moves between alternate hosts and orchard crops at various times of the season. These alternate hosts include many ornamental plants around residential areas, as well as wild woody species in and around forests. Because of it's host range and dispersal behavior, BMSB has become known as a "border pest", in that populations will often be found on crop borders before being seen in the interior of the crop.

BMSB biology enables all life stages (except newly emerged nymphs), to feed on a preferred host crop throughout the life of the insect. Once eggs are laid on the leaf surface, the nymphs hatch (emerge). Newly emerged nymphs cluster around hatched eggs, then molt into second instars before dispersing to feed on the host, including developing fruit. There are 5 nymph instars plus the adult. All these stages feed on the host plant on which the eggs were laid, in this case apples and peaches. This is different from most other (native) stink bugs that reproduce on alternate hosts, before coming into the orchard to briefly feed, usually as adults. Once in the orchard, BMSB will feed continuously. Both nymphs and adults will



also disperse to other fruit varieties within the orchard as they ripen or as the original host is harvested.

Objectives

The objectives of this study were to:

1) Evaluate a BMSB trap use in commercial settings.
2) Evaluate the efficiency of transect sampling in commercial peach and apple plantings.
3) Determine if BMSB populations were greater on the orchard borders.
4) Determine the distribution of any resulting BMSB feeding.

Methods

This work summarizes the work done in 2013 in 6 peach and 3 apple blocks. In each block a pair of transect sampling lines was established. One transect, called "TT" transect, had under the first tree, a standard 3' black pyramid trap baited with ARS#20 BMSB aggregation pheromone + an MDT adjuvant (ChemTica). The other transect was marked as "NT" for "no trap" transect. Sampling trees, one at each sampling point, were marked at 4 locations along each transect point starting at the woods border tree and extending in for 3 more trees every 120'. Trees were sampled starting in early June with 3 minute timed counts for BMSB adults and nymphs. An at harvest count was done at first picking by looking at 100 fruit per sample tree for the number of BMSB and catfacing damaged fruit, plum curculio (PC) damaged fruit and the number of clean fruit.

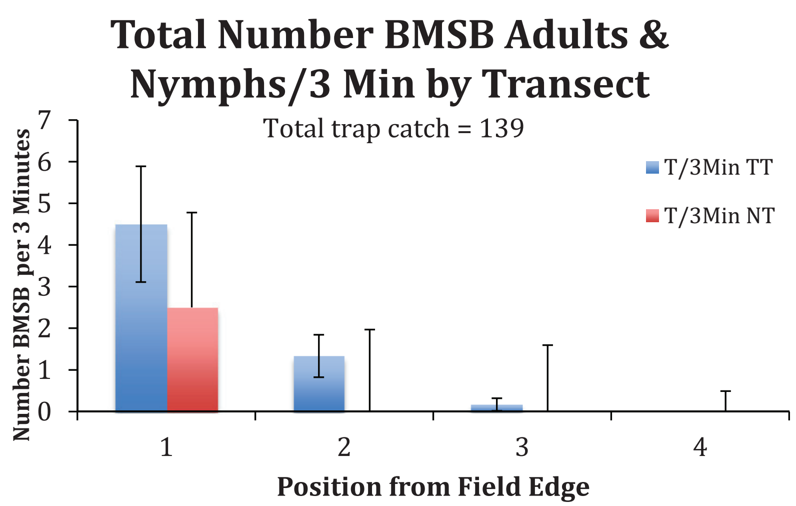


Figure 1. Average timed counts along peach transects.

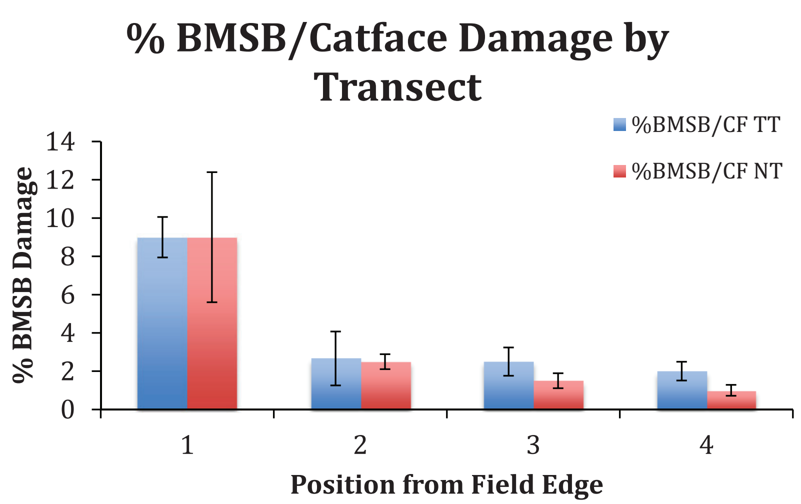


Figure 2. Average at harvest BMSB and catfacing damage in peach.

Results

The number of BMSB was greater before harvest along the woods border and decreased quickly in interior trees (Figure1). The pattern of at harvest damage matched that of the timed counts in that more damage was present along the woods edge (Figure 2). At various times of the season greater numbers of BMSB were seen in the

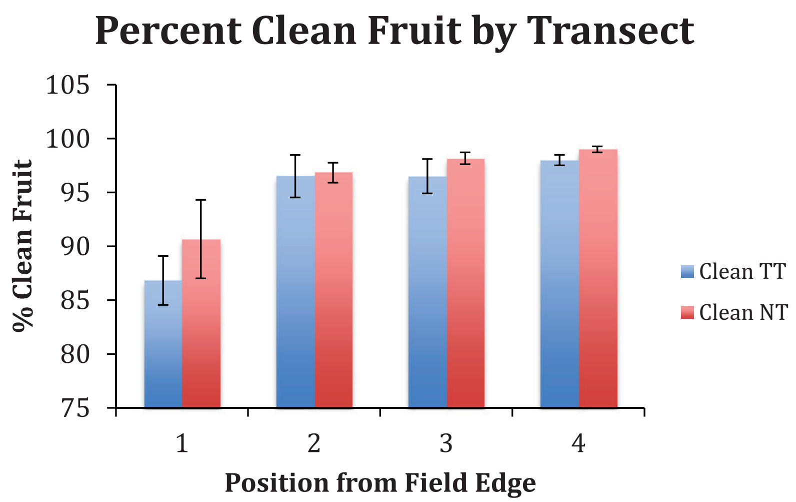


Figure 3. Percent clean fruit along peach transects.

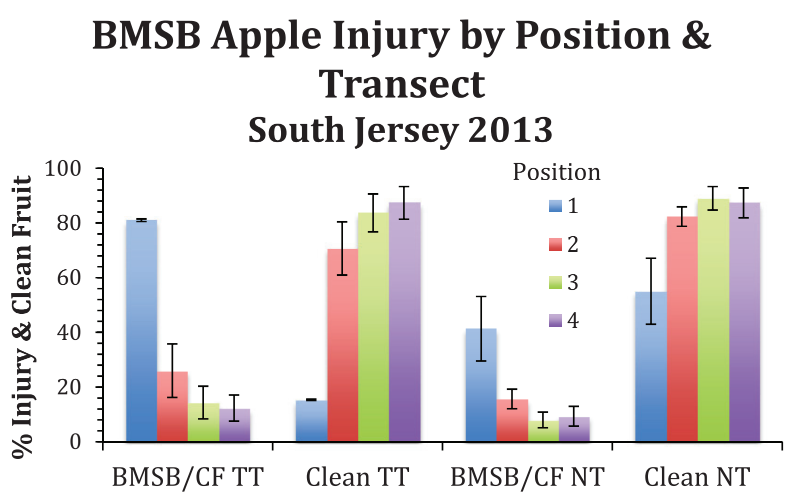


Figure 4. Catfacing damage and clean fruit by position, trap transect (TT) and no trap (NT) transects.

trees where the traps were placed, but there was little difference in the BMSB damage the fruit in those trees sustained compared to the other border trees where no traps were placed. The percent clean fruit was lower on the border trees compared to all interior trees (locations 2-4) (Figure 3). Similar patterns in BMSB distribution and damage were seen in apples (Figure 4.)

Discussion

All orchard blocks used in this work were being commercially treated. These means that in some cases, the grower would have likely benefited from either supplemental border treatments, or by having a tighter spray interval when BMSB were present. Given the distribution of damage, it shows the importance of orchard borders and their relationship to BMSB damage. It appears that the most important locations for monitoring BMSB populations and feeding injury are at orchard borders. In this case it was defined as a woods edge. However edges bordered by maturing grain or corn have also shown to be more highly damaged than interior trees. Timed counts were low throughout the season, and may not be the best way to assess BMSB populations. Since the traps caught significant numbers of stink bugs, they will likely be more reliable as we continue work on how to use them.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Spraying May be Effective, But It Surely Is Not Efficient

Steve McArtney
Southeast Apple Specialist, NCSU, UGA, UT, Clemson

Agrochemicals represent a major input cost in modern apple production systems and are applied with axial fan air-assist sprayers. Around full bloom, when plant growth regulators are applied for crop load management, enhancement of fruit shape, or russet reduction, the proportion of spray intercepted by the canopy is typically only 40 percent. Even if spray droplets reach the intended target, penetration of many agrochemicals and foliar nutrients into the plant is low due to the chemical properties of the cuticle. Penetration of the active ingredient in many agrochemicals and nutrient sprays occurs through tiny pores in the cuticle during the droplet drying phase. Minimal additional movement into the plant occurs once the droplet has dried, leaving a dried residue of the active ingredient on the plant surface. Rainfall or dew can initiate additional uptake due to re-wetting of the dried residue, however significant losses can also occur due to wash-off after relatively minor rainfall events. Spray additives such as surfactants, penetrants, or humectants may help (or hinder) uptake by altering droplet spread (contact area), droplet drying time, and how quickly the active ingredient penetrates the cuticle. Estimates of the proportion of active ingredient that actually penetrates the target may be as low as 6 percent at bloom (assuming 40 percent of the total spray volume is intercepted by the canopy, and 15 percent of the active ingredient in a droplet that lands

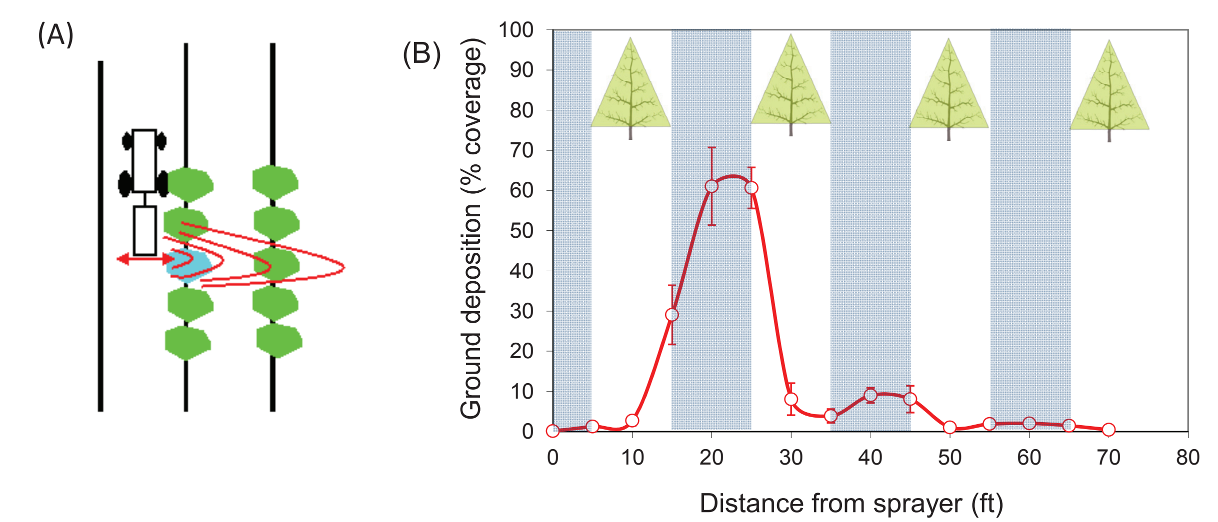

Figure 1. Schematic depicting movement of air carrier and spray droplets from an air assist sprayer in an apple orchard (A). Deposition of spray droplets from an axial fan sprayer onto the ground in a mature 'Pink Lady'/M.7 apple orchard planted in rows 20 feet apart (B). The trees in (B) represent the position of the orchard rows. Shaded columns in (B) represent the row-middles (grass alleyways). Ground deposition was measured as percent coverage on water sensitive cards placed on the ground at 5 feet intervals along a transect perpendicular to the rows. (pressure, 100 psi; ground speed, 2 mph; water rate, 168 gal/acre).

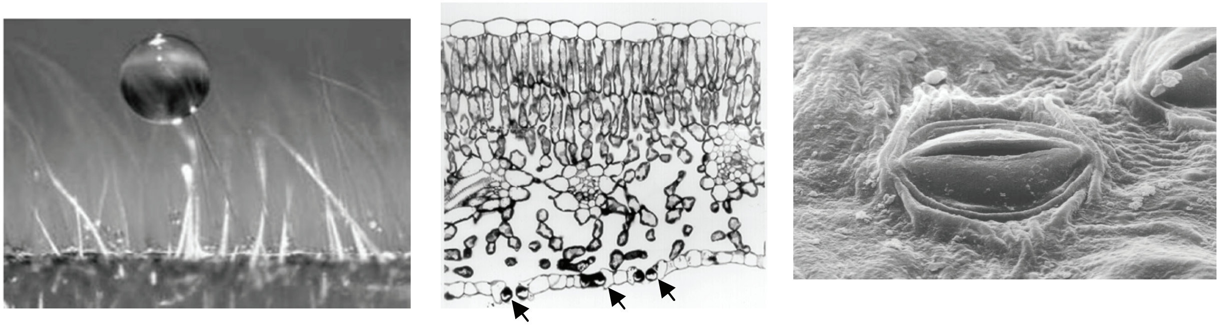

Figure 2. Tiny hairs called trichomes can impede movement of the spray droplet through the cuticle, reducing uptake of dissolved agrochemicals (figure on left: source Xu et al., 2010). Stomata on the underside of the leaf are tiny pores (arrows in middle photograph) that open and close to regulate the loss of water vapor (leaf temperature), carbon dioxide and oxygen. Even when fully open (photograph on right), conventional surfactants permit less than five percent of the total spray dose to infiltrate through the stomata.

on the target will penetrate the cuticle prior to drying), increasing to 12 percent at full canopy development (80 percent interception, 15 percent penetration). How efficient is that?

Interception from Air Blast Sprayers is Low

Axial fan air-assist sprayers are the most common delivery system for agrochemicals (fungicides, insecticides and plant growth regulators) in modern apple orchards. While there is no disputing their effectiveness, air blast sprayers can be a very inefficient system for delivering agrochemicals. Interception of chemical sprays by the canopy of apple trees changes throughout the season; it is lowest in the dormant stage, and increases as the canopy develops. Data from the NYSEAS in Geneva, NY indicate that typical losses from an orchard sprayer include evaporation (4-6 percent), drift (10-15 percent), and spray landing in the row middles (30-50 percent), so that only 29-56 percent of the total spray volume may reach the intended target. In our own research we estimated spray interception values of only 26 percent in a mature 'Pink Lady'/M.7 orchard just after bloom [1]. Interception values for high density apple orchards in the Netherlands are slightly better, ranging from 20 percent in dormant trees to 70-80 percent at full canopy development [2]. Spray interception in high density orchards was around 40 percent at full bloom, when application of chemical thinners and other growth regulators are frequently made.

One of the shortfalls when considering interception alone as a measure of sprayer efficiency is that it does not account for differences in spray coverage in different parts of the canopy. For example, spray interception may be higher in medium density orchards where the trees are larger and have a dense canopy compared to high density orchards on dwarfing rootstocks. However, in a dense canopy much of the spray is intercepted by the outer leaf layers, and spray coverage on foliage and fruit in the inner zones of the canopy may be reduced to the point where the dose of active ingredient is below that needed to effectively control the pest, pathogen, or plant process of interest. Air provides the carrier for spray droplets, and good dispersal of droplets throughout the canopy is dependent on complete displacement of the air space within the canopy with spray droplets. Complete air displacement is easier to achieve in narrow, low-density canopies typical of high density tall spindle or fruiting wall type orchard systems compared to the wide, dense canopies typically found in medium density orchards.

Alternate-row spraying provides several advantages over spraying every row. While the time between each successive application must be shortened to ensure that adequate coverage of the active ingredient is maintained over time, each spray event is itself much quicker. This helps greatly if you have a lot of ground to cover, or if unfavorable weather limits the amount of time available for spraying. However, not all orchards are suitable for alternate row spraying. Maintenance of an effective concentration of active ingredient across the canopies of all rows is dependent on sufficient movement of pesticide-laden air through the canopy of the row immediately opposite the sprayer, across the adjacent row middle, and into the canopy of trees in the adjacent row. This is likely to occur throughout the entire season in narrow, low density canopies with narrow between-row spacing. In medium density orchards with wide, dense canopies and wide between-row spacing however, alternate-row spraying may only provide adequate spray deposition throughout the canopy until second or third cover. There may be other disadvantages associated with alternate-row spraying. There may be a reduction in spray interception associated with the cost of moving pesticide laden air to the second row from the sprayer – increased ground deposition of spray in the row middles. Furthermore, because the airspeed decreases so dramatically with distance from the sprayer, there will be minimal penetration of spray droplets into the canopy of the second row.

After Interception and Deposition, the Next Obstacle is Getting the Active Ingredient into the Plant

The plant surface is covered by a specialized layer of waxes and cutin/cutan called the cuticle. This forms a barrier between the plant and its environment that protects the plant from desiccation and other environmental stresses. However, the cuticle also forms a barrier to movement of water and most agrochemicals (and foliar nutrients) into the plant. The thickness of the cuticle of an apple increases greatly during the season from around 2 micrometers at bloom to around 15 micrometers at harvest. Movement of water in either direction across this barrier is limited due to the chemical properties of the cuticle.

The underside of apple leaves are covered in small pores, called stomata, through which gases (CO_2/O_2) and water vapor can move. The plant can open and close these pores to regulate water loss and temperature. The density of stomata on the underside of the leaves is high, ranging from 300-400 per square millimeter. It is logical to expect that movement of foliar sprays into the leaves might occur through the stomata. However, because of the small diameter of the stomatal pores (only 2-3 micrometers when open) and the high surface tension of water, spray droplets do not normally penetrate the leaf through stomata. The surface tension of pure water is 72 mN/m, and significant infiltration of liquids through stomata will not occur until the surface tension is lowered to 25 mN/m or less [3]. Conventional surfactants reduce surface tension, but few lower it enough to promote significant stomatal infiltration. With conventional surfactants, stomatal infiltration only accounts for a few percent of the total dose on the leaf [4]. This is probably a good thing, because the last thing you want is to carry an active ingredient like captan into the leaf tissues. Captan residues on the leaf provide protection against fungal pathogens. Captan residues in the leaf on the other hand may cause significant phytotoxicity.

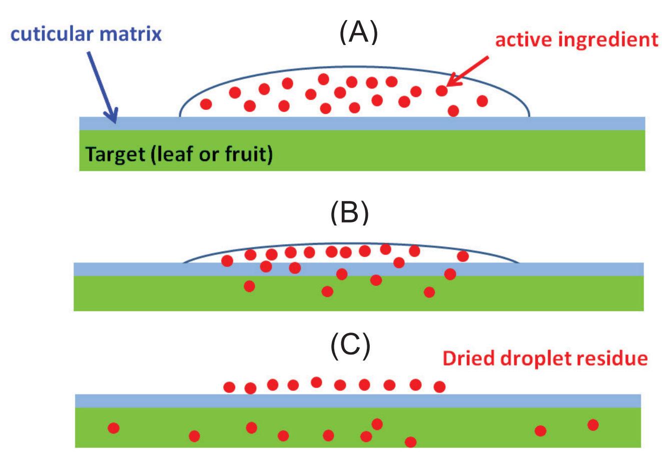

Figure 3. Schematic depicting uptake of active ingredient from a drying spray droplet on the plant surface. Penetration of many active ingredients and nutrients through the plant cuticle is rapid during the drying phase of the droplet, as represented in (A) and (B). Residue on the cuticle after the droplet dries (C). The residue does not penetrate, or penetrates very slowly, unless re-wetting occurs. However, residues may be washed off the plant surface, even after minor rainfall events.

The flowers and young apple fruit are covered by small hairs called trichomes. Trichomes also cover the lower side of the leaves during the entire season. Trichomes act as a barrier to spray droplets, limiting direct contact between the droplet and the cuticle when the surface tension of the liquid is high. Agricultural surfactants reduce the surface tension so that movement of spray droplets to the fruit or leaf surface is impeded by trichomes to a lesser extent.

How Do Agrochemicals Get Into the Plant?

If the cuticle is a barrier to movement of many agricultural chemicals and nutrients dissolved in water droplets into the plant, and infiltration through open stomata is limited, then how do active ingredients get into the plant? Experimental evidence suggests the existence of tiny, water-filled pores in the cuticle with a diameter one-thousand times less than the diameter of open stomata, through which nutrients and the active ingredients in many agrochemical sprays can enter the plant [5]. Recent studies into the movement of ReTain through fruit cuticles [6] indicate that most of the uptake occurs during the droplet drying phase; penetration of ReTain was largely halted once the spray droplet dried, leaving a residue on the cuticle surface which could act as a reservoir for additional uptake upon re-wetting. Only 4 percent of the ReTain in a 10 microliter droplet penetrated the cuticle during the first hour after application, while the droplet was drying. By 120 hours after application of the droplet, the amount of ReTain that penetrated the cuticle increased to only 12.5 percent.

The Wash-off Problem

Rainfall events soon after spraying can greatly reduce the amount of active ingredient present on or in the plant by inducing wash-off. Losses of mancozeb after just 5 mm or 0.2 inches of light (0.5 mm per hour) or torrential (48 mm or 2 inches per hour) rain resulted in losses of 50 percent and 90 percent, respectively [7]. Under dry conditions, the daily loss of captan from apple leaves was around 1 percent, compared to a 50 percent loss after as little as 1 mm of rain following application [8]. Losses of unformulated calcium chloride salt from apple leaves after 1 hour of heavy rainfall (5 mm or 0.2 inches per hour) was greater than 70 percent [9].

Can Spray Adjuvants Help?

Spray adjuvants include surfactants, penetrants and humectants. An excellent review of the effects of adjuvants on activity of plant growth regulators was provided by Bukovac [10]. Surfactants reduce the surface tension of the spray solution, increasing droplet spread on the target, thereby increasing the contact area between the dissolved agrochemical(s) and the pores through which the active ingredient can penetrate the cuticle. Penetrants are specially formulated to increase movement of agrochemicals and nutrients through the waxy plant cuticle. Humectants slow the rate of droplet drying, and can increase penetration by maintaining the active ingredient in solution for longer periods to facilitate increased movement through the pores in the cuticle. Addition of humectants to foliar calcium sprays was found to increase fruit calcium levels and reduce bitter pit of apples in a dry climate, where drying of spray droplets is typically rapid [11]. We tried the same approach in 2013 but found that addition of a humectant (Hum-AC 820, Drexel Chemical Company) to foliar calcium sprays did not affect the incidence of bitter pit at harvest or during storage. However, 2013 was an unusually wet year in the southeast, where we accumulated the average annual rainfall (60 inches) by June 30. The absence of any beneficial effect of a humectant might be due to the excessive rainfall simply washing calcium deposits off the fruit before they could be absorbed. Alternatively, the advantage of humectants might be minimal in humid regions where drying of droplets is much slower compared to arid climates. However, we did find that addition of a penetrant/acidifier (Vader, Loveland Industries) to postharvest calcium drenches resulted in a significant reduction in bitter pit of 'Golden Delicious' during storage compared to drenching without the penetrant. Following on from this research, we are interested in evaluating the effect of this penetrant/acidifier on the efficacy of foliar calcium sprays in future work.

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IFTA Annual Conf. in Kelowna, BC, Canada, 2014

Rajan Bagha Orchards, Coldstream, BC. Gala planted 1 by 10 feet. Photo credit Win Cowgill.

Jamie Kidston demonstrates pruning Ambrosia apple on B9 planted in a tall spindle system. Photo Credit Win Cowgill

Jon Clements wondering what's going on in BC. Photo credit Win Cowgill.

Win Cowgill and Gary Mount represented NJ. Photo credit Jon Clements.

Six Massachusetts fruit growers attended the 2014 International Fruit Tree Association Conference held in Kelowna, B.C. Canada on February 22-26, 2014. Pictured here during the Conference Tour in a dwarf pear orchard on the outskirts of Kelowna are (left to right) Mo Tougas, Jim Krupa, Tim Smith, Mark and Ellen Parlee, and Jon Clements.

Cleft Grafting in Chepachet, Rhode Island -- April 17, 2014

Wes Autio and Win Cowgill demonstrated cleft grafting techniques on apple, and assisted growers in a hands on grower workshop at a twilight meeting at Steere Orchards in Chepachet, Rhode Island on April 17, 2014. The meeting was hosted by the Rhode Island Fruit Growers Association. Cowgill was also an invited speaker presenting " Treatments and options for apple thinning, and the use of other plant growth regulators in apples."

Maturity Standards for Asian Pear Harvest?

Win Cowgill and Rebecca Magron
New Jersey Agricultural Experiment Station

As part of a Northeast Regional Asian Pear Variety Trial, established in New Jersey in 2010 at the Rutgers Snyder Farm, Pittstown, NJ, much has been learned to date. Over the past two growing seasons in NJ part of our work has focused on determining how to know when to harvest Asian pears.

Background

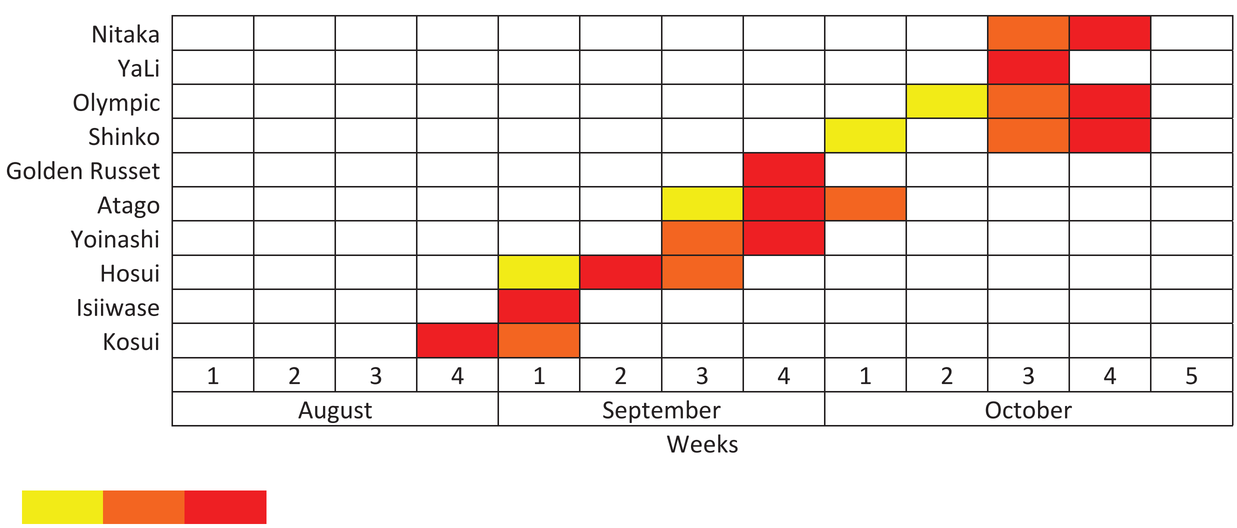
Asian pears are becoming an important commodity for selected growers in NJ. New Jersey has over 200 acres planted with more acreage planned. Contrary to horticultural practices used in growing European pears, Asian pears are more labor-intensive to thin, harvest and transport, therefore commanding an increased commitment and learning curve for the grower, but setting a premium market price. Growers utilizing tailgate markets and pick-your-own marketing have done well attracting the large Asian population in New Jersey as well as educating other consumers about Asian pears to increase their market penetration. Asians make up 8.25% of NJ's population of 8.9 million people.

Our variety trial consists of 10 cultivars of Asian and two European cultivars. With the fireblight-susceptable European cultivars, we should be able to evaluate the Asian pears for fireblight tolerance under NJ growing conditions. Figure 1 lays out the harvest dates of our varieties begging the end of August with Kosui and ending with Nitaka the end of October.

Every grower that produces Asian pears struggles to pick them at the correct maturity.

What we have learned is that you cannot use conventional apple maturity testing on Asian pears. The Starch Iodine test does not work, Brix testing for Soluble solids is not reliable and pressure testing is not very helpful either. Unlike apples, Asian pears do not ripen up in storage so they have to be harvested and stored pretty much tree-ripe. All too often this is not the case and fruit being sold is less than optimal.

Figure 1. 2013 Asian Pear maturity dates, Rutgers Snyder Research and Extension Farm, Pittstown, NJ



Color sequence represents increasing yield at each spot pick, red color equals highest yield.

Maturity Standards

Harvesting tree ripe Asian pears depends on the following factors, both ground and over color, flesh texture and of course taste! One of our goals of this trial is too develop maturity standards for the best cultivars we identify for NJ and develop simple protocols for growers to determine when to harvest their Asian pears for optimum flavor and marketability.

Note that small fruited Asian pears will not develop the sugars and flavors. Asian pears must be thinned to a single fruit per spur and maybe one every other spur. If crop load is excessive fruit quality will suffer. See the citations below for how to chemically thin Asian pears to remove 50% of the fruit. The rest of thinning must be done by hand clipping.

What we have learned is that you must begin sampling each variety two weeks before anticipated harvest. While each variety will have its own parameters, specifically to color both the back ground color and the over color. It does help if you know what a specific variety and is meant to look like and taste like. The true secret is starting early and then sampling the fruit every 4-5 days.

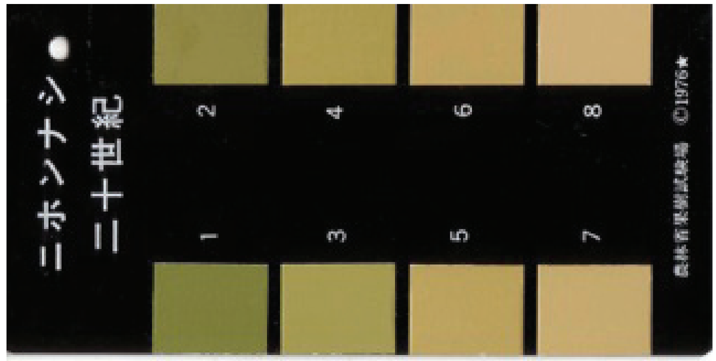


Figure 2. Asian pear ground color chart. Japanese republished by UC Davis.

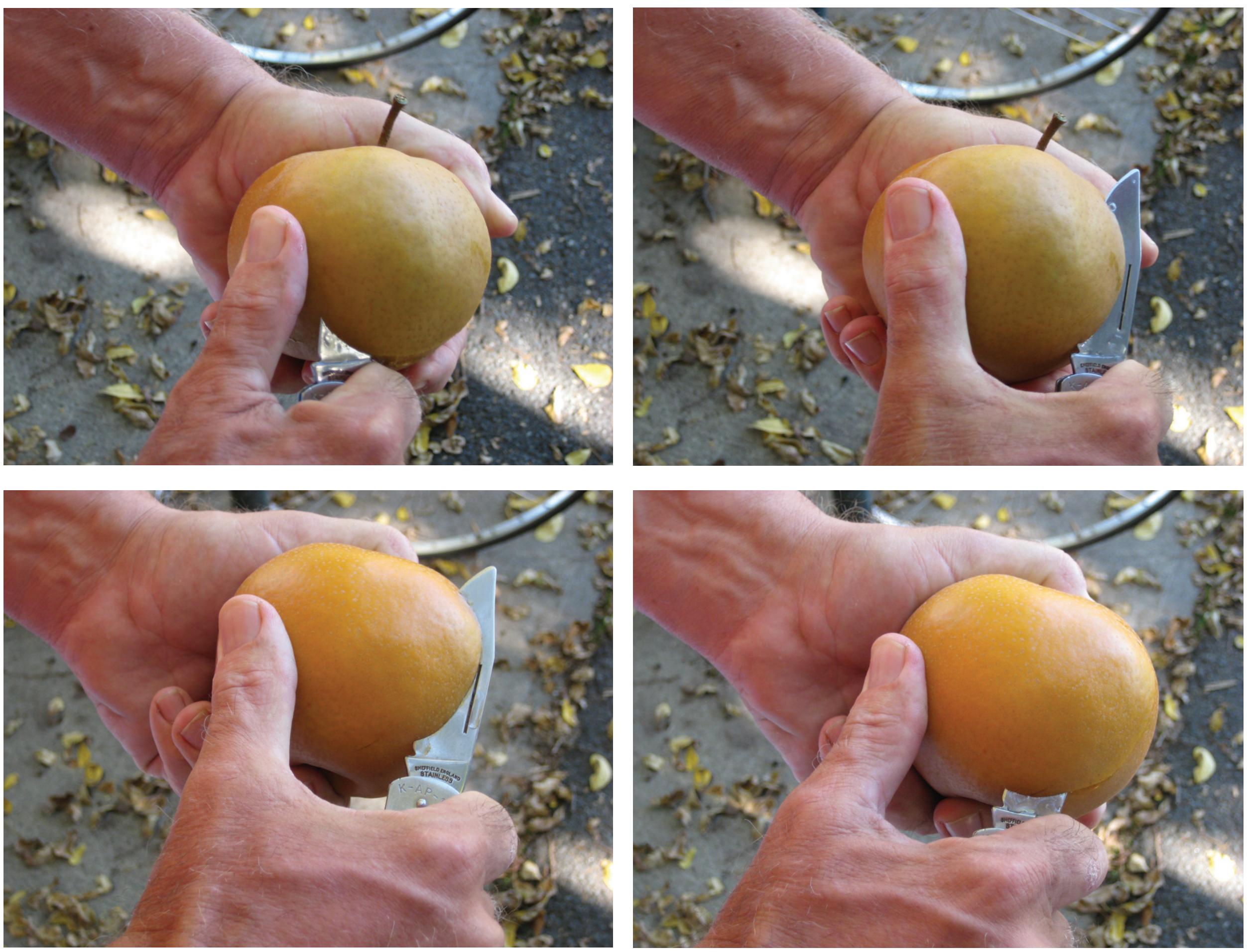


Figure 3. Demonstrating the knife technique: upper photos are of the green side and lower phots are of the sunny side.

You will start to see the back ground color change and the sugars come up as the fruit ripens and gets sweeter. You have to sample fruit for each cultivar from multiple trees to make sure you have a random sample.

In 2012 we started evaluating maturity using the UC Davis Color Chart **(Figure 2)** as a starting point. We attempted to match the ripening pear's background color to the chart. This is an older chart and not all the orange colors were on the chart.

What I found in 2013 was that by starting well ahead of ripening, if you walked the blocks every few days, you could start to see the background color change. As it changed from green to brown or green to yellow (Ya Li) it was easy to see the change.

Individual fruits also ripen on the sunny side of the tree first (south and southwest) and individual fruits will not ripen uniformily, the sunny side can be more mature than the back shaded side. The entire fruit has to begin to change color to be ripe enough to harvest.

For texture and eating quality, you also had to sample the fruit and eat a slice to check for sugar/flavor. Immature fruit will not taste good and will be hard. You have to sample the green side as well to make sure that it is ready. Fruit that has not sufficiently ripened will not have the varietal flavors associated with that pear. It will also be hard and crunchy vs sweet and melting.

We learned one trick/tool for evaluating Asian Pear maturity from an old friend and outstanding Asian Pear Grower, Mr. Ging Lee, Pittstown Fruit Farm, Pittstown, NJ.

Use a sharp knife to slice the flesh of the pear. Bite into a ripe Asian pear and then slice that same pear with a knife (same sharpness) to get the "feel" of what a ripe pear should slice like. When tasting Asian pears, only taste the flesh and not the skin to make sure your evaluating the maturity of the flesh for taste and texture. You will begin to relate maturity and good taste with the flesh texture as measured by the slicing knife. When the Asian pear fruit is totally green (immature), the knife will barely slice the fruit, you have to pull it through. As you try it on a riper fruit, the knife will slice more easily. When fully ripe, it glides right through the fruit. Continue to use the same knife each time you assess field fruit maturity throughout the season. I used this approach extensively in 2013 with great success. The more you use it, the more accurate you will be. You can get to the point where you just slice and you know where you are. See Figure 3 – demonstrating the knife technique.

One of our biggest take away messages from doing detailed maturity sampling was that almost all Asian pear varieties must be harvest multiple times to have mature fruit fit to eat. Most required 3-4 harvests and some 5 harvests. It is also important to note that some cultivars drop permaturely and will require the use of a stop drop (like Retain®).

In Summary

For harvesting Asian pears at optimum maturity you do the following. Begin tracking background color 2 weeks before anticipated harvest. As background color changes color, slice with knife for texture rating and taste the fruit Both green shaded side of fruit and sunny side must be sampled. Utilize as many harvests as necessary (3-5) to only pick mature fruit.

Stop Drop

Note that some Asian pears can drop prematurely. Retain can be used on pears and I know a number of growers.

Citations

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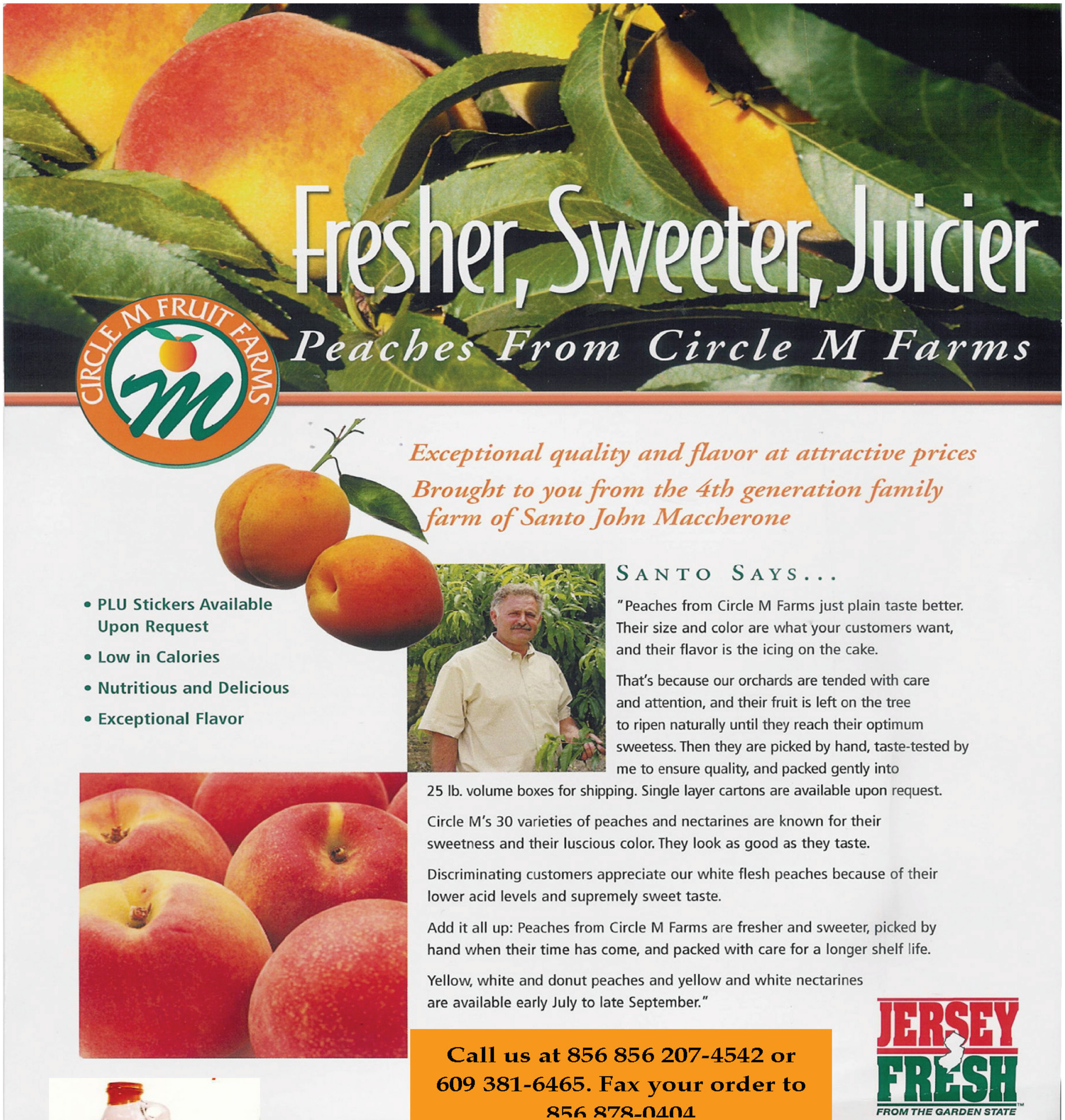
Braching research treatments at Adams County Nursery in Milton Delaware, June 14, 2013 with various plant growth regulators.



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