Fruit Notes

Volume 83, Number 3: Summer, 2018

Fruit Notes

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

Fruit Notes (ISSN 0427-6906) is published four times per year by the Stockbridge School of Agriculture, University of Massachusetts Amherst. **The cost of a 1-year hard-copy subscription is $40 for U.S. and $50 for non-U.S. addresses. The cost of a 1-year electronic subscription is $20.** Each 1-year subscription begins January 1 and ends December 31. Some back issues are available for $10 each. Payments via check must be in United States currency and should be payable to the **University of Massachusetts Amherst**. Payments by credit card must be made through our website: *http://extension.umass.edu/fruitadvisor/.*

Correspondence should be sent to: Fruit Notes
Stockbridge School of Agriculture
205 Paige Laboratory
University of Massachusetts Amherst
Amherst, MA 01003

Table of Contents

Cover: Rutgers strawberry selection. Photo credit Peter Nitzsche.

Evaluation of the Use of Two Full Rates of ReTain on Preharvest Drop and Fruit Quality of Honeycrisp at Harvest and Following a Period of Cold Storage, 2017

Duane W. Greene and James Krupa
Stockbridge School of Agriculture, University of Massachusetts Amherst

Three of the most popular apples grown in the New England are McIntosh, Honeycrisp, and Gala but unfortunately the time of ripening of these is nearly identical. Two other popular varieties Macoun and Cortland ripen very soon after. Delay in normal harvest of any of these varieties due to difficulties in harvest management can result in the harvest of poor quality fruit that have reduced storage potential. Based on recent experience and success using high rates of ReTain we have shown that we can use two full rates of ReTain (two 333 g pouches/acre) on McIntosh and Cortland to improve overall quality of late-harvested fruit, and in the case of McIntosh achieving effective control of preharvest drop.

Honeycrisp and Gala are two varieties that have national importance and consequently the demand for these varieties is increasing. These two varieties also are relatively low ethylene emitters and as a result lower rates of ReTain (1/3 to 1/2 of a pouch) are generally used to minimize the delay in red color development. ReTain is used primarily on Honeycrisp to delay preharvest drop whereas it is applied to Gala to slow ripening and reduce stem-end cracking.

Pick-your-own is a method of sales that is prominent in New England and is an important component in many growers' business plan. Sales on weekends in late September and in the first 2 weeks in October are extremely important, and success during these later weekends in the fall often makes the difference between a successful season and one far less profitable. Therefore, it would be very beneficial to have fruit of both varieties on the tree for pick-your-own late into the season.

Last year we did a nonreplicated experiment with both Gala and Honeycrisp where we treated with a split application of two full rates of ReTain in late August and early September. Fruit were harvested on Columbus Day, at the end of second weekend in October. The fruit quality was very good and we concluded based on the quality of fruit that this approach to handling these varieties was very positive and had potential. The

delay in red color development did not appear to be a problem at harvest and the high fruit quality of both varieties in late September and into October. Observations made over the past 5 to 6 years has been by using high rates of ReTain (one application of 2 pouches or two split applications of 1 pouch each time) slows down maturity and allows apples to ripen later in the season when the weather is invariably more favorable for red color development. The additional time on the tree also improves the eating quality of these later harvested fruit.

In 2017 we decided to do a full evaluation using two full rate application of ReTain (2 pouches/acre) on Honeycrisp and evaluate fruit quality periodically from the time Honeycrisp are normal harvested until Columbus Day. We were also concerned about the postharvest potential of fruit harvested at the end of the second week in October. Once harvested, how long would it be possible to store the fruit and still have high quality fruit to sell? Was the fruit still saleable? A concern was that late harvested Honeycrisp are more prone to develop soft scald in storage than fruit harvested early.

Therefore, harvested fruit were conditioned by keeping them at room temperature (60° F) for 5 days prior to placing them in air storage at 32° F. All remaining fruit on the treated trees and the control trees were harvested, placed in air storage and evaluated after 6 weeks and 13 weeks.

Materials & Methods

In a block of 8-year-old Honeycrisp/M.9, 10 groups of trees containing two to three contiguous trees were selected and marked. These groups were further paired by crop load and proximity in the row into 5 blocks (replications) containing 2 groups of trees. Within each replication one group was randomly chosen to serve as the untreated control where no ReTain spray was applied and the second group of trees was sprayed twice with ReTain, first on August 21 and again on September 7 with one pouch of ReTain (333g) per acre applied using a commercial airblast sprayer at the TRV volume of 100 gal/acre. Silwet L-77 was included in the tank at a rate of 0.05 % (v/v). One tree in each block was designated as the drop tree and no fruit were harvested from that tree during the experiment. One tree in each block was designated as the sample tree and all fruit were harvested from that tree. On September 5 all dropped fruit were picked up under the drop trees and then twice weekly, fruit were picked up, counted and recorded until the experiment was terminated in October. At the end of the experiment all fruit were harvested from the drop trees and counted to allow calculation of cumu-

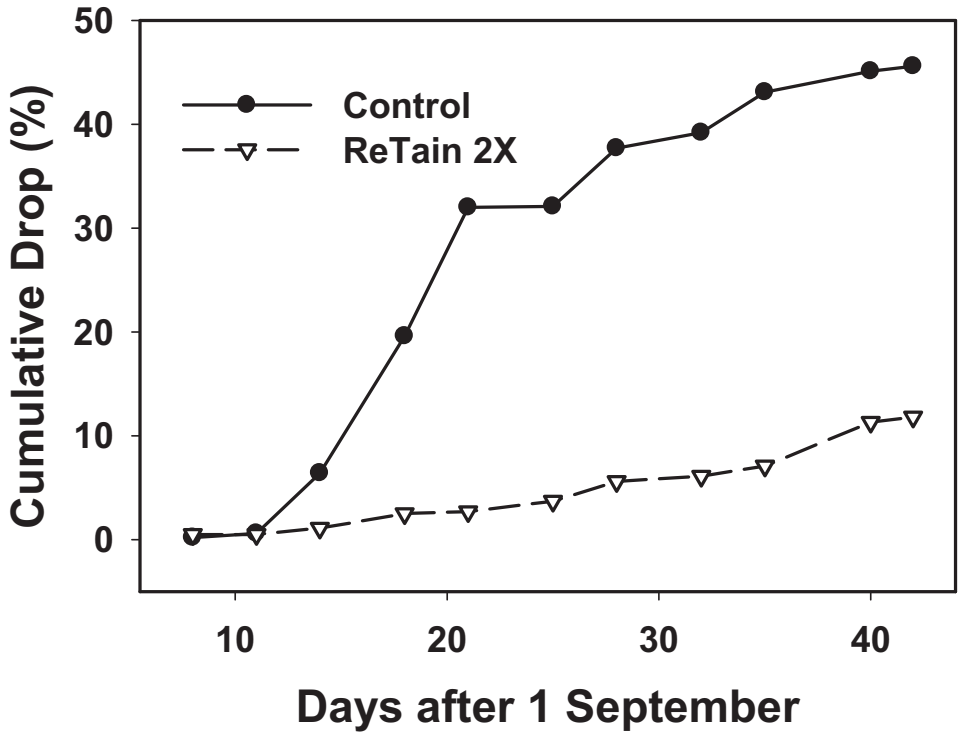


Figure 1. Influence of two full rates of ReTain (two 333g pouches/acre) on preharvest drop of Honeycrisp apples.

Table 1. Influence of two full rates (2 pouches/acre) ReTain on fruit quality of Honeycrisp at harvest, 2017.

Treatment[1]	Weight (g)	Red color (%)	Firmness (lb)	Soluble solids (%)	Starch rating (1-8)	Climacteric (%)
	---------- Mean 4 harvests (9/15, 9/25, 10/5, 10/12) ----------					
Control	224	77	12.5	12.1	7.4	88
ReTain	234	63	13.3	11.9	6.1	15
Significance[2]						
ReTain (R)	NS	*	**	NS	***	***
Harvest (H)	***	***	***	***	***	**
R x H	NS	NS	NS	NS	***	**

[1]One pouch (333g) ReTain was applied at a TRV dilute rate of 100 gal/acre on August 21 and September 7.
[2]***,**,*,NSSignificant at P = 0.001, 00.1, 0.05 or nonsignificant.

lative drop.

A 15 apple sample was harvested from each sample tree on Sept. 15, 25, Oct. 5 and 12. Fruit were taken to the lab where they were subjected to a standard fruit quality evaluation. They were weighed and the surface red color was estimated to the nearest 10%. The internal ethylene was determined on a 10 fruit subsample by extracting a 1 ml gas sample from the core of each apple and injecting it into a gas chromatograph. Internal ethylene was measured and recorded with the aid of a digital integrator. The percent climacteric fruit was determined by noting the number of fruit in the sample that had an internal ethylene content of 1 ppm or more. Flesh firmness was taken on these fruit by making 2 punctures on each apple with a pressure tester using an 11 mm head. Juice collected during the firmness test was measured for soluble solids contents using a digital refractometer. Fruit were then cut at the equator and dipped in an iodine solution and evaluated using the Cornell Generic Starch chart using a scale of 1 (immature) to 8 (over mature). One bushel of fruit was harvested from each block and placed at room temperature for 5 days. Following this conditioning period all fruit were placed in air storage at 32° F for later evaluation. On November 20, 6 weeks after fruit were placed in storage, fruit were evaluated for storage disorders and then returned to the storage. Fruit were again removed from storage on January 4, after 13 weeks after being placed in storage. At this

Table 2. Influence of two full rates (2 pouches/acre) ReTain on storage disorders following 6 or 13 weeks in regular air storage, 2017.

Treatment[1]	Firmness (lbs)	Soft scald (%)	Bitter pit (%)	Rot (%)	Cracking (%)	Lenticel breakdown
	---------- 6-weeks storage ----------					
Control	-----	0.3	0.3	4.9	26.9	1.4
ReTain	-----	6.0	0.0	1.4	7.5	1.1
Significance[2]		NS	NS	**	***	NS
	---------- 13 weeks storage ----------					
Control	10.3	2.1	0.6	13.6	31.8	3.8
ReTain	12.3	21.1	0.3	3.0	10.5	2.6
Significance[2]	*	**	NS	**	***	NS

[1]One pouch (333g) ReTain was applied at a TRV dilute rate of 100 gal/acre on August 21 and September 7.
[2]***, **, *, NSSignificant at P = 0.001, 0.01, 0.05 or nonsignificant.

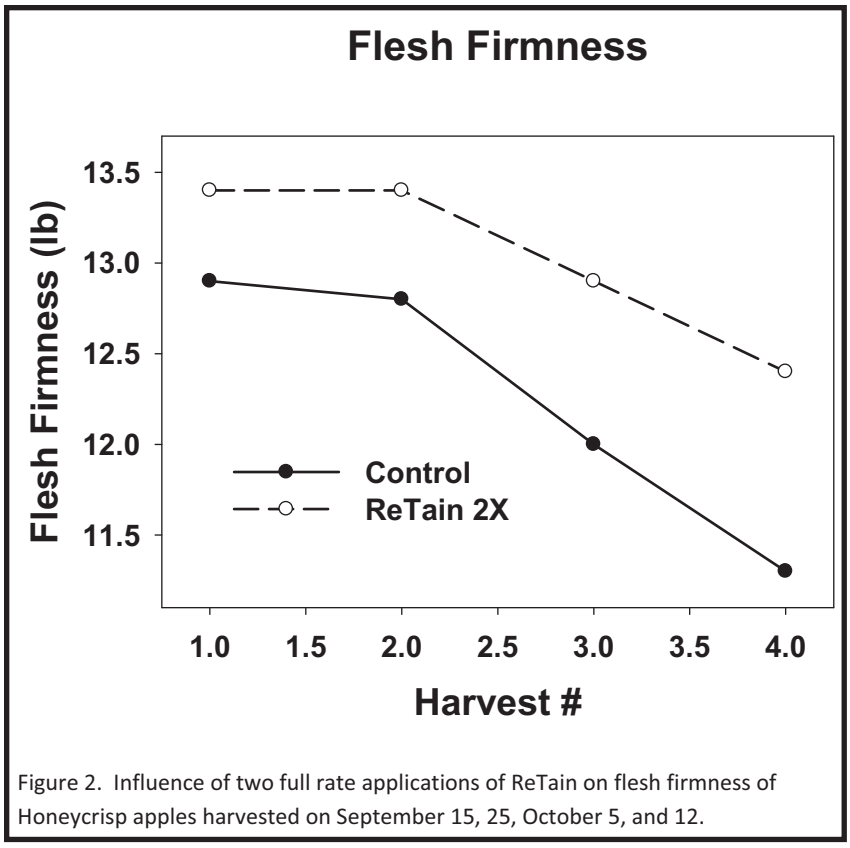


Figure 2. Influence of two full rate applications of ReTain on flesh firmness of Honeycrisp apples harvested on September 15, 25, October 5, and 12.

time fruit were pressure tested as previously described. The remaining fruit in each box were reevaluated for development of storage disorders.

Results & Discussion

Honeycrisp is a variety that can have severe preharvest drop problems in some years. Results in this experiment showed convincingly that preharvest drop can be controlled with the two applications of ReTain well into October (Figure 1). At the end of the experiment (October 12), cumulative drop on ReTain-treated trees was 11.8 percent whereas cumulative drop on the control trees it was 45.6%. The 2017 season was not a severe drop year for Honeycrisp. However, these data show that by using the high rates of ReTain, losses due to preharvest drop can be held to a minimum through periods where preharvest drop is often severe during the last half of September. These data also confirm observations made over many years and that is that if preharvest drop can be controlled until later in the fall, environmental factors change resulting in less drop. The ReTain certainly did control drop during the heavy drop period from Sept 15 to Sept 28, a period of time when preharvest drop can be substantial. Even though the check fruit were ripe, based upon the climacteric data, they did not drop in October at the rate they did earlier. The degree of drop control demonstrated in this experiment should provide growers with piece-of-mind during September when drop can be severe.

Fruit quality information collected over the course of the experiment is illustrated in Table 2. The data shown for each parameter represents the mean of the four harvest

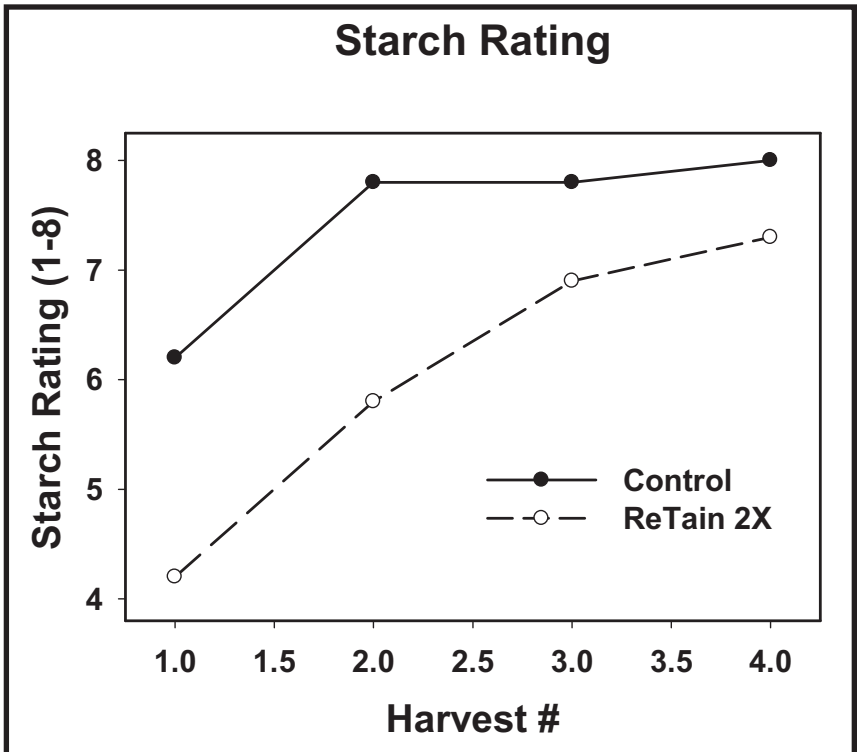


Figure 3. Influence two full rate appllications of ReTain on the starch content of apples using the the Cornelll Gebneric Satrch chart, 1=immature 8=over mature.

dates and the ANOVA includes all harvests dates. With the exception of fruit weight, ReTain significantly influenced all parameters evaluated.

Flesh firmness is significantly affected both by ReTain and harvest date. We have not evaluated Honeycrisp over such a long period and we are surprised at the seemingly fast rate of decline of firmness with time, especially in October (Figure 2). ReTain delayed the loss of firmness of Honeycrisp. If one compares the firmness of control fruit on Sept 15 and ReTain treated fruit in October, they are essentially identical.

The extent of starch degradation in the harvested fruit is a measure frequently used to assess the stage of ripening of fruit. If one compares the starch rating of control fruit on September15 with ReTain treated fruit in October the starch rating of treated fruit is lower, 7.8 vs 6.9 and 7.3 (Figure 3). An alternative method to assess the stage of ripening, and one that is often considered more definitive, is to measure internal ethylene. Fruit with 1 ppm internal ethylene are frequently considered climacteric (Figure 4). Fruit treated with ReTain have a similar percent of climacteric fruit on the last harvest date as control fruit had on the first harvest date. These data present a very compelling case to suggest that the stage of ripening of ReTain-treated fruit in October (Oct 12) is comparable to fruit quality of untreated Honeycrisp at the initial (normal) harvest time on Sept. 15.

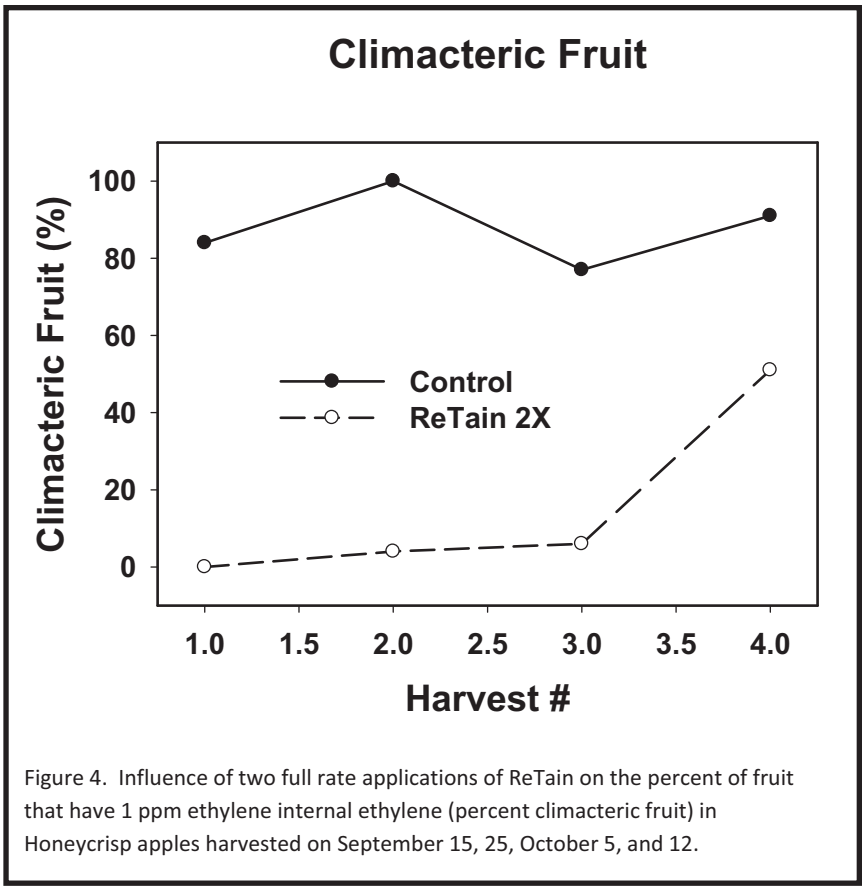


Figure 4. Influence of two full rate applications of ReTain on the percent of fruit that have 1 ppm ethylene internal ethylene (percent climacteric fruit) in Honeycrisp apples harvested on September 15, 25, October 5, and 12.

An objective of this experiment was to determine if quality Honeycrisp with acceptable red color could be harvested in October. If one compares the percent red color of the untreated fruit on September 15 with the color of treated fruit on October 5 and 12 the red color is similar if not identical (Figure 5). If one compares red color development of the ReTain treated fruit with control fruit at similar stage of maturity it clearly shows that ReTain does not decrease red color but rather these fruit have a very similar amount of red color when one compares red color at comparable stages of maturity. In October treated fruit did have very good color and thus we conclude that a reduction in red color development would not be a problem in October on Honeycrisp treated with high rates of ReTain.

Although no taste evaluation was done in this investigation, we did taste the fruit.
Honeycrisp harvested in October were different, both treated and untreated. Honeycrisp is normally characterized at harvest as having noticeable acidity. Although not measured late harvested Honeycrisp appeared to have a reduced acidity level compared with untreated fruit harvested on September 15. Several tasters commented on this. The treated Honeycrisp had excellent quality with good taste and attractive appearance. We considered these were the best Honeycrisp harvested on the farm in 2017. Initial observations were made after 6 weeks in storage (Table 2). Fruit quality of ReTain-treated fruit after 6 weeks in storage was considered acceptable (Table 3). There was a small but statistically nonsignificant amount of soft scald and fruit cracking on treated fruit. Treated fruit were of acceptable quality and we could say that the treated fruit could be kept safely in storage for 6 weeks (until

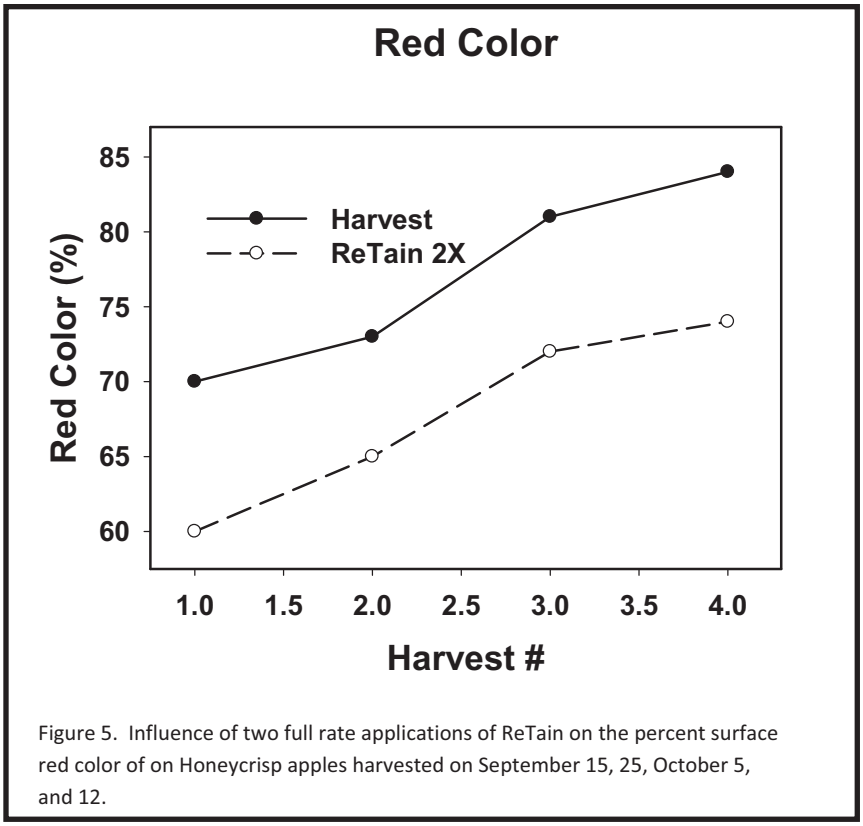


Figure 5. Influence of two full rate applications of ReTain on the percent surface red color of on Honeycrisp apples harvested on September 15, 25, October 5, and 12.

Thanksgiving). Untreated control fruit were starting to show rot and significant cracking and we considered the quality of these fruit to be marginal at best. A second evaluation of stored fruit was made after 13 weeks in storage. Flesh firmness of treated fruit was deemed unacceptable (10.3 lb). However, they showed a significant increase in soft scald, and an increasing amount of skin cracking. The increase in soft scald was not expected due to the fact that maturity was delayed relative to the untreated control. This observation must be checked in the future. As was observed in the earlier storage evaluation, control fruit control were not of acceptable quality at the time of evaluation with a large amount of skin cracking and increased fruit rot. Fruit look "old" and the fruit taste, firmness and texture were unacceptable.

Summary

The results of this investigation demonstrated quite clearly that the use 2 pouches of Retain per acre (666 g total) is a viable option for growers who wish to delay harvest of Honeycrisp until October. First, growers who wish to have quality Honeycrisp on the tree into October for the pick-your-own customers and second as a vehicle to manage harvest when too many fruit of different varieties ripen at the same time. ReTain-treated fruit in October had nearly identical quality if not identical quality as untreated Honeycrisp that were harvested during the normal harvest period on 15 September. If a grower wishes to manage harvest by deferring harvest of Honeycrisp until October then this option appears to be an attractive one as well. The drop control into October was excellent and fruit quality was comparable to fruit harvested on untreated trees earlier. If a grower chooses this option it is our suggestion that these fruit should not be put in long term storage.

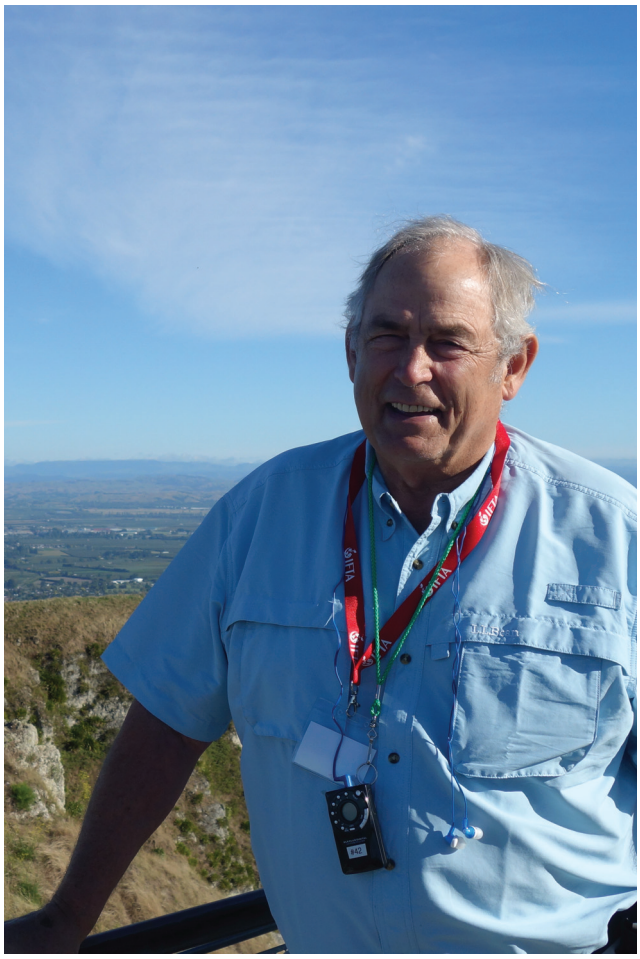
The Spice of Life, International Fruit Tree Association Trip to New Zealand

Gary Mount
Terhune Orchards, Princeton, New Jersey

I am writing this as I return from an apple growers trip to New Zealand. That is what we do—go look at orchards. Annually, I meet with other apple growers to visit and analyze apple orchards around the world. This year the trip was in the southern hemisphere where we saw not only orchards, but Apples! Lots of apples—it is harvest time in New Zealand. We looked at how the trees were growing—height, row spacing, tree width, spacing between trees, the types of rootstock used—all sorts of fascinating things like that. Well, at least they are interesting to an apple grower, but this year there was an added treat. There were lots of different new varieties of apples. And varieties add spice to the life of a farmer. Different varieties of fruits and vegetable can differ in taste, color, shape, size, firmness, keeping qualities, texture—the list goes on. In the apple business, especially the wholesale export apple business of New Zealand, having a desirable apple variety to sell can make the difference between success or failure of an orchard.

New Zealanders (Kiwis) are leaders in the world in discovering and developing new apple varieties. The

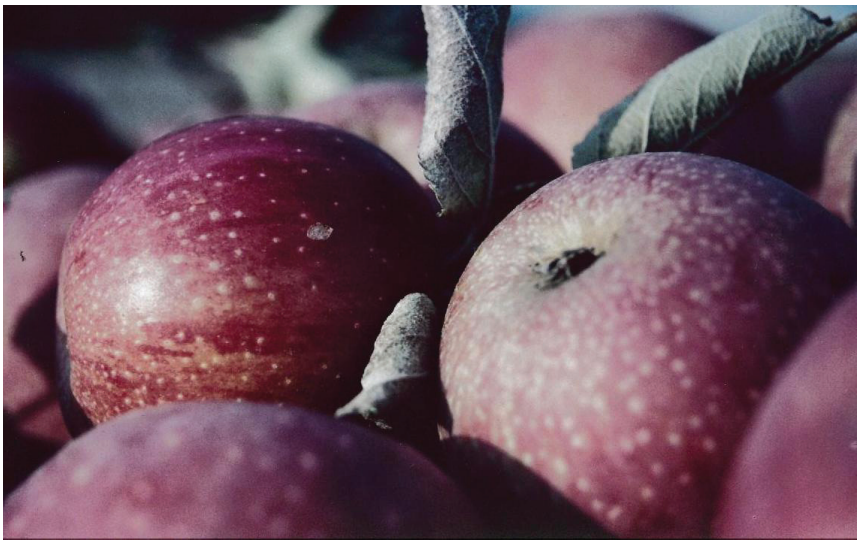
find some by means of controlled cross breeding of two known varieties. The pollen of one apple is used to fertilize the flower of another apple. Usually this is done with a camel's hair brush. The seeds of the resulting apple are planted and the new trees are carefully observed. It is a slow, exacting process but, with luck, there is sometimes a great new apple variety. Other varieties occur either



as a naturally occurring mutation of a fruit bud or as a mutation of a whole limb. The usually happens in the orchard of a grower who is sharp-eyed enough to realize what is happening and smart enough not to prune off the wood the next winter. After a year or two of observation, the grower contacts a tree fruit nursery to see if there is any interest in propagating the new apple.

New apples that I saw had names like galaxy, smitten, rockit, piqua-boo—well, Kiwis are better at growing than naming.

The apple growers group, the International Fruit Tree Association, last visited New Zealand 18 years ago.



New Zealand has a small population and must export all their apples—traditionally to Great Britain. The main apple was Cox's Orange Pippen which was a favorite of the Brits but not really marketable to anyone else. Taste buds are very regional. When we visited back then, the Kiwi apple industry was in trouble. Great Britain had joined the European union and lower cost apples from France and Germany had taken the New Zealander's market. The Kiwis were left with apples that were difficult to sell elsewhere in the world. In the last 20 years, they have rebuilt their industry with breeding and development of new varieties specifically chosen for the Asian markets which were relatively nearby, becoming more prosperous and hungry for apples. The taste buds of China, Korea, Japan, Vietnam and others are looking for apples that are large, red and very sweet.

As orchards were replanted, New Zealand adopted new techniques and new rootstocks. They learned how best to use their abundant sunshine and long growing season to advantage. Their shipping and marketing system is tops. Production is high, quality is excellent and profits are even better. Many of their new ideas ca e from our apple growers organization, the IFTA, which has been steadfast in the free exchange of information over the past 60 years. We fund research in better apple growing (I am the chair of the research committee) and hold annual conferences at fruit growing locations around the world. As visitors, we were met by very friendly Kiwi fruit growers. We shared a common passion and our histories have been their histories.

Farmers' excitement over new varieties does not stop with apples—far from it. Every farming endeavor is a constant search for better varieties. Not just food crops but all other farmed crops and animals (in livestock production, substitute "new breed" for "new variety").

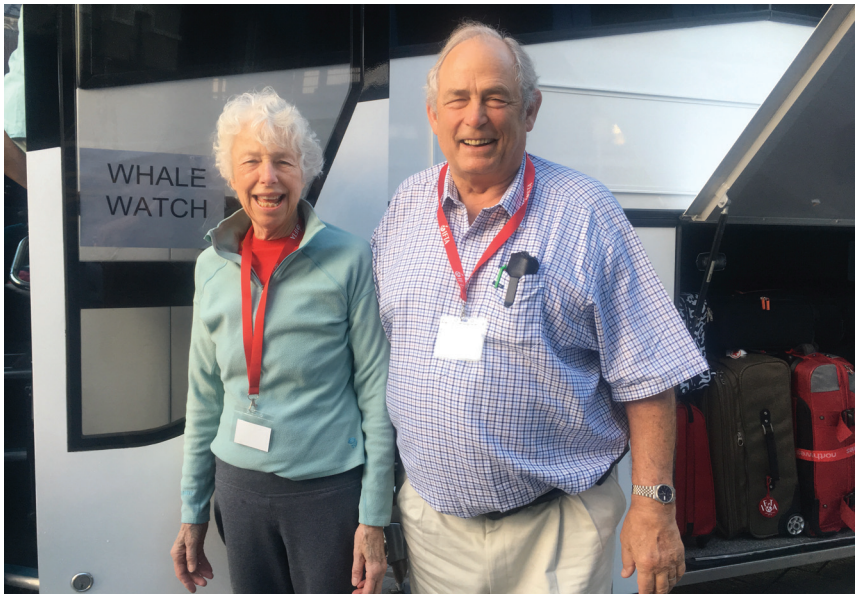
And then there is the coconut. On the way home from my new Kiwi friends, Pam and I visited Mike and Angelina McCoy in Hawaii. We know Mike from when we served as Peace Corps volunteers 50 years ago. We were on a small Pacific island—smaller than my father's farm—in Micronesia called Satawal. Pam and Mike were teachers; I was an agricultural agent. I specialized in coconut culture—important because coconuts were the life sustaining crop of the island. One thing the islanders wanted was help with—you guessed it—new varieties. An improved variety can produce a better crop simply by virtue of its genetic makeup. Better coconuts (size, shape, weight, taste, etc.) can grow from the same sun, air, soil and water just by being a better

type of coconut.

The Satawal coconuts were small. When husked, the nut was about the size of a tennis ball. I was able to bring in a new variety that was not only a good growing plant, but which had a much larger coconut. When husked, they were larger than a large grapefruit. We set the nuts, which are really coconut seeds, out in a nursery and when they sprouted, we planted the best-looking ones. When I was there, we replanted about half of the island. Our three years' time in the Peace Corps came to an end before any results were visible. However, Pam and I were able to visit about 20 years ago—one week of travel in each direction. We attended the ordination of one of Pam's students as a catholic priest. The island had lots of coconut, large coconuts. As the trees that I had planted matured, the Satawalese took the nuts and replanted the rest of the island!! One of my happiest moment ever was when I overheard a visitor from another island ask "Where did the Satawalese get such large coconuts?"

We had such a nice visit in Hawaii with Mike and Angie and also three other returned Peace Corps volunteers who had served on the same small islands during the time we were there. We were last together 50 years ago.

It became time to head back to Terhune Orchards. One of the first crops that will be ready for picking are strawberries and I need them uncovered, weeded, fertilized and ready to grow. Later this year we will plant a new strawberry field and will include a terrific new variety, Rutgers Scarlet. It has big berries, nicely red and good tasting. They will be ready to pick in May of 2019. New varieties are the spice of this grower's life.



For more info on Rutgers Scarlet Strawberry see: https://news.rutgers.edu/news/better-tasting-strawberry-developed-rutgers-makes-its-debut/20150510 and https://www.youtube.com/watch?v=oJaIP8fC8mY Photo of Rutgers Scarlett strawberry from Peter Nitzsche.

Editors Note: This article was originally printed in Terhune Orchard News, the newsletter of Terhune Orchards, https://terhune-orchards.com/

‘Rutgers Scarlet’™ Strawberry

Peter Nitzsche and William Hlubik
Rutgers Cooperative Extension, New Jersey Agricultural Experiment Station

‘Rutgers Scarlet’™ (U.S. Plant Patent #27,587) is a short day strawberry (*Fragaria x ananassa*) cultivar released from the Rutgers New Jersey Agricultural Experiment Station breeding program in 2015. Dr. Gojko Jelenkovic developed ‘Rutgers Scarlet’™ through traditional plant breeding methods in 1999. ‘Rutgers Scarlet’™ is a seedling of a hand pollinated cross and was selected for its vigorous plant growth, productivity and high fruit quality.

Plant & Fruit Characteristics

‘Rutgers Scarlet’™ plants have a vigorous upright growth habit and establish rapidly when planted in a plasticulture system. In matted row systems, ‘Rutgers Scarlet’™ plants produce sufficient runner plants to fill a bed. Fruit is produced in late mid-season on long trusses so it is held away from the plant. ‘Rutgers Scarlet’™ fruit is large, long wedge to long conical shape, and has uniform deep red color. ‘Rutgers Scarlet’™ was selected for flavor and farmers and consumers who tasted the fruit rated it very highly.

Performance

‘Rutgers Scarlet’™ was bred to provide eastern United States farmers (USDA Plant Hardiness Zones 5b through 8a) with a high quality, flavorful strawberry cultivar for high density plasticulture growing systems. There is limited information on ‘Rutgers Scarlet’™ in matted row production systems, but farmers who used it in trial matted row plantings reported favorably on its performance.

Replicated research and on-farm observational trials in plasticulture systems have compared ‘Rutgers Scarlet’™ primarily to the commercial standard cultivars ‘Chandler’ and ‘Camarosa’. ‘Rutgers Scarlet’™ marketable yield has typically been similar to that of ‘Chandler’. Fruit size is typically the same or slightly

larger than that of 'Chandler'. The sugar content of 'Rutgers Scarlet'™ fruit measured in Brix is typically higher than that of 'Chandler'. Fruit firmness and post-harvest attributes are similar for 'Rutgers Scarlet'™ and 'Chandler'.

Production Practices

'Rutgers Scarlet'™ should be grown following the guidelines outlined in The MidAtlantic Berry Guide for Commercial Growers *http://extension.psu.edu/publications/agrs-097/view*.

Conclusion

'Rutgers Scarlet'™ offers a commercially viable alternative to 'Chandler' in the eastern United States, especially for farmers with pick-your-own operations or access to local farmers markets. In this market segment, the shape, color and flavor of 'Rutgers Scarlet'™ fruit will appeal to consumers who are increasingly interested in local small scale production and freshly picked flavorful fruit.

Availability

'Rutgers Scarlet' is being propagated and is being sold in 2018 by two licensed commercial nurseries:

Kube-Pak Corp.
194 Rt. 526
Allentown, NJ 08501
Phone: (609) 259-3114
Fax: (609) 259-0487
http://www.kubepak.com/

Nourse Farms, Inc.
41 River Road
Whately, MA 01093
Phone: (413) 665-2658
Fax: (413) 665-7888
http://noursefarms.com/

For updates on availability see: http://breeding.rutgers.edu/strawberry-availability

The "X" Factor

Jeff Alicandro
agr.assistance

Just ask any apple grower who also grows vegetables or strawberries: Spraying tree fruit crops truly *is* quite different than spraying other crops. Partly because of the exaggerated 3-dimensional nature of generally taller tree fruit plantings- but also because of all the different rootstocks involved and the resulting wide diversity of planting systems with highly variable row spacings, tree shapes, tree widths and tree heights. Spraying an acre of soybeans is *pretty much* like spraying any other acre of soybeans--- but that's not at all true with many treefruit crops and especially not so with diverse apple production systems.

That's why unique spraying systems have been developed for treefruit crops- primarily airblast spray rigs which utilize both water and wind to achieve thorough spray coverage. And that's also why unique dialects have evolved around the business of spraying perennial treefruit crops like apple trees. You know- those often murky and confusing concepts like tree-row volume(TRV), concentrate spraying, use of rates per 100 gallons dilute and "X" spraying (3X vs. 6X. etc.)- in addition to the more ubiquitous "per acre" standard verbiage used across most other cropping systems. And don't think that all fruitgrowers in all regions of North America talk the same talk when spraying apple trees--- *heck they don't always talk the same talk down at the local coffee shop!*

So what does "X" spraying really mean- like applying "3X" sprays vs. "6X" sprays ?

- Most experienced fruitgrowers were schooled on and thoroughly understand the concept of concentrate spraying in orchard crops- spraying with higher water volumes like 3X vs. using lower volume applications like 6X or 8X. However, few growers or crop consultants would agree on when and why it's wise to spray at 3X vs. 6X vs.10X water volumes. *Hey it's complicated--- plus what the heck did you think we do all winter long?*
- On the other hand, ag industry personnel often are bewildered by the jargon used in spraying treefruit crops- since they are used to working with field crops where "an acre is an acre". And after reading thru pesticide labels, many label authors were also thoroughly confused about what these orchard spraying concepts meant. *And surprise!!- make sure you're sitting down for this one: EPA is even more confused yet...*
- No matter what "X" is applied, the exact same product rates are applied per acre on a particular orchard. A "3X" spray uses only 33% of the water volume (gpa) of a 1X(dilute) spray- but three times(=3X) the amount of material is put into a 3X tank compared to a 1X tank- resulting in the same chemical rate being sprayed per acre in a particular orchard- even though the actual water volume(gpa) applied may vary from spray to spray.
- 1X = full dilute spraying - as determined either by actual tree-row volume measurements or estimated using accepted industry standards. The old standard for dilute spraying was based on 400 gpa- but as tree plantings became a bit more dwarfing it evolved to 300 gpa for full dilute. Today many processing apple blocks and sour cherry blocks are sprayed on a 300 gpa dilute basis- while many dwarf fresh fruit apple blocks are sprayed on a 150-225 gpa dilute basis. *However almost no commercial growers spray dilute anymore.*
- 3X = spraying at one-third of the full dilute(1X) water volume- so for bigger processing apple blocks 3X spraying typically translates to applying 100 gpa(= 33% of the 300 gpa dilute basis); for dwarf fresh fruit apple blocks 3X spraying often translates to applying 50-75 gpa(= 33% of the 150-225 gpa dilute basis)
- 6X = spraying at one-sixth of the full dilute(1X) water volume- so for bigger processing apple blocks 6X spraying typically translates to 50 gpa(= about 16-17% of the 300 gpa dilute basis); for dwarf fresh fruit apple blocks 6X spraying often translates to applying 25-37 gpa(= about

16-17% of the 150-225 gpa dilute basis)

- Since most commercial fruitgrowers farm across a wide range of tree planting systems and ages, applying a single "3X" spray might mean applying 50 gpa in one orchard, 75 gpa in another and 100 gpa in another yet.

What does it all really mean both today and down the road?

- Many fruitgrowers continue to talk about spraying at "3X" or "6X" water volumes- while others are more accustomed to discussing the actual gpa applied. Either way ultimately you also have to be able to cipher and record the actual pesticide product rates *which are applied per acre*- regardless of your gpa or "X" applied.
- Spray records *always* need to list pesticide rates *per acre*- that's what both auditors and fruit buyers require.
- Since modern dwarf apple plantings typically have a much lower variation in dilute TRVs- it will increasingly make sense to deal in rates per acre for ALL apple orchards as well. *But we're not quite there yet...*

And now you know *why* I turned prematurely gray... (and yeah both YOU and my family chipped in some too).

Editors Note: Jeff Alicandro is the owner of agr. assistance, a grower consulting company in western New York. *http://www.agrassistance.com/* This article was reprinted with permission from agr.news e-newsletter.

A Few Perspectives on the Future of Tree-fruit Production in Northern New Jersey

Megan Muehlbauer
Rutgers Cooperative Extension/NJAES

Tree fruit production New Jersey is uniquely challenging. Sandwiched between two major cities in the most densely populated state in the USA, growers must be particularly progressive in what they choose to grow and how they market their crops. Fortunately, the proximity of their farms to these cities allows growers the opportunity to market their produce to a large number of consumers with widely varying tastes.

Tree fruit acreage has dramatically increased in northern NJ since 2010. Significant new orchards/farms have and are being established. Over 500 acres of new high density apple production has been established in northern New Jersey (Dean Polk, 2016 RCE Tree Fruit Working Group Report).

As a tree fruit grower, the integration of both new apple varieties and a mix of heirloom varieties will be critical for the vitality of future of apple production in Northern New Jersey. New varieties peak consumers interest, while older varieties will reinvigorate markets.

In addition, the newly emerging hard cider industry has inspired 6 plus new cideries, established or planned in north Jersey, all with new apple acreage or expanded acreage for existing apple producers.

Heirloom varieties have also gained significant attention for their use in hard cider production. I have established two research blocks this spring at the Rutgers Snyder Research and Extension Farm and at Valley Crest Farm and Preserve, Clinton, NJ to investigate the feasibility of hard cider apple production in New Jersey. Keep an eye out for the one-year report on this study in the fall edition of *Horticulture News*.

In addition to expansion and integration of new apple production in Northern New Jersey. Several additional crops including hazelnuts are being researched as lucrative additions to diversified tree fruit farms in New Jersey and beyond.

Hazelnut production is gaining increasing interest as a tree nut crop to grow in Northern new Jersey. With varieties from the Rutgers Hazelnut Breeding program nearing release onto the market. This crop requires less maintenance, fewer chemical and fertilizer inputs than apples and has the potential to be integrated into many value added products. Making this an appealing crop for the future.

Jake Peterson topworks (with bark grafts) 20-year-old Delicious apple trees at Valley Crest Farm to hard-cider cultivars. Note that scions will be shortened to two buds, and ideally, a nurse limb should have been left on the tree. All exposed wood will be treated with grafting compound or paint.

New Teflon-coated, Yellow, High-tensil Trellis Wire

This new trellis wire is available only from Adams Coutny Nursery. It reflects the sun and does not heat up and stretch as much as normal high-tensile wire. It also is very visible so pruners are less likely to accidently cut it.

Controlling Secondary Apple Scab

Win Cowgill

Professor Emeritus Rutgers, Win Enterprises International, LLC

Apple Scab is one of the major diseases to control in apple production. If you are aggressive and start early (Green Tip), you can achieve near perfect scab control. That being said, apple scab is showing up on leaves in several blocks in NJ and PA. The secondary scab resulting from spore release from these primary leaf infections is harder to control. You will have to be aggressive to keep the fruit clean.

As soon as you see active scab lesions, either a complete spray of: Option 1- Captan 5 pounds/A should have been applied to protect the fruitlets or Option 2 -Captozeb' program that has 3 lbs of a Mancozeb/A product + 2 lbs Captan 80W plus a systemic fungicide. Remember that Mancozeb has a 77 Day PHI. Once that is reached, the only option is a full rate of Captan plus one of the systemic fungicides.

Captan 80WDG must be reapplied every 7 to 10 days, depending on rainfall. After 1.5 to 2 inches of rain, retreat. Note that fruit must be covered and recovered until you are 100% sure that all the primary scab lesions have been burned out of the leaves, or you will run the risk of secondary scab infection. The full rate of Captan 80 WDG is 5lbs/A.

The other systemic fungicides should be added to each spray to try and burn out scab in the leaves. Use the best materials at the highest rates. We are concerned with fungicide resistance to both the DMI and strobilurin fungicides. Also rotate systemic fungicides by FRAC groups with each spray. If you think that you have resistance and have not used Topsin M for a while, consider that for your first spray.

Use Topsin M-70WSB (1) at 1 lb/Acre to burn scab out of leaves. In subsequent sprays switch to sterol inhibitors (Inspire Super (FRAC 3+9) or Indar 2F (FRAC 3)). Also, SDHI's (Luna Sensation (FRAC 7+11), Merivon (FRAC 7+11), Aprovia (FRAC 7), or Sovran (FRAC 7)) may be used in place of the sterol inhibitors.

Note that you may need up to four weekly applications of full rate Captan plus a systemic to control secondary scab. For the rest of the summer keep Captan in the spray at 10-14 day intervals

Systemic fungicides, like Sovran (FRAC 11) then Inspire Super @12ounces/Acre (FRAC 3) should also help control cedar apple rust and the summer diseases.

According to Serjan Acimovic, Cornell Hudson Valley Lab, you need 190 hours of wetting (counting from PF onward and using NEWA data for your specific location) for sooty blotch/flyspeck infections. Be ready to ramp up your fungicides of choice to prevent sooty blotch and flyspeck infections and summer rot diseases.

Thank you to Serjan Acimovic and Dan Cooley (UMass Amherst) for help on secondary scab control.

Cedar Apple rust on cedar trees (the alternate host) in Annandale, NJ. Make sure to begin applying fungicides to apple trees at the pink stage to prevent infection. Photo Credit: Butch Sorge.

More Photos of Yellow, Teflon-coated Trellis wire

Fruit Notes
University of Massachusetts Amherst
Stockbridge School of Agriculture
205 Paige Laboratory
Amherst, MA 01003-9286