



Honeycrisp – Past, Present, and Future

Dr. Jim Schupp, Penn State FREC Pomologist

Honeycrisp - Here to Stay

Many of us still view Honeycrisp as a “new” variety, but it has been available to growers for about 17 years. Millions of trees have been planted, and millions of bushels have been produced. Honeycrisp is an established variety, and continues to grow in popularity. This apple will have a long run because it has great consumer appeal and fruit texture. While production of high quality Honeycrisp is challenging, consumer demand hasn’t been tapped as yet. Fresh market apple growers should consider planting Honeycrisp as part of their “portfolio” of varieties. The high profit potential must be weighed against the high risk of low packouts due to its difficult production challenges. The ideal percentage of Honeycrisp to include in your portfolio depends on your commitment, ability, and your aversion to risk.

The BIG Question – *Can You Grow It?*

Honeycrisp is a cold climate variety – bred in Minnesota for Minnesota. Shortly after its release, a number of producers, marketers, and even some nurseries drew maps showing that Honeycrisp should only be produced in northern growing regions. Purveyors of conventional wisdom said that Pennsylvania was south of the line. This assumption has proven to be invalid. Internal quality does not decline as Honeycrisp moves south. Pennsylvania-grown Honeycrisp are as delightful to consumers as are those grown in the cold blue north. Some of the post-harvest problems related to chilling injury, while present in Pennsylvania, seem less prevalent than in colder growing climates. Pennsylvania growers and our customers are very fortunate that this outstanding variety was released without club restrictions that excluded us from growing it based on invalid assumptions! Development of adequate red skin color, bitter pit, and storage disorders are the key issues associated with Honeycrisp production, because these problems directly impact marketability. To a varying extent, these problems are present everywhere Honeycrisp is grown.

Poor Color Development

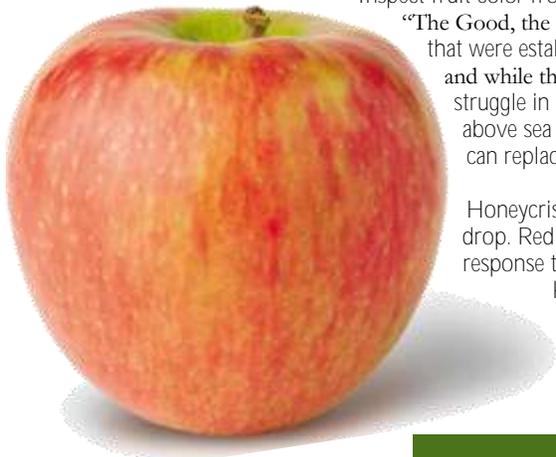
Inspect fruit color from tree to tree as you walk through a block of Honeycrisp just before harvest, and you will see “The Good, the Bad, and the Ugly”. These observations seem especially true of the earliest Honeycrisp plantings that were established in the early and mid-’90s. This variability in red skin color is less a problem in the North, and while the best trees look great in southern Pennsylvania, the worst “strains” look bad everywhere. I struggle in some years to obtain adequate red color on Honeycrisp in southern Pennsylvania at 730 feet above sea level, while commercial growers to my west at 1100 to 1200 feet have few problems, so elevation can replace latitude when considering where Honeycrisp can best be grown.

Honeycrisp red color formation is unresponsive to ethephon, although this chemistry does accelerate fruit drop. Red color formation is variable within a given tree, primarily because it ripens unevenly, but also in response to light environment. Dwarfing rootstocks are advisable to ensure more even light distribution, but keep in mind that Honeycrisp trees have been 30 to 40% smaller than other varieties on the same rootstock. This suggests planting at closer tree spacing and on rootstocks that provide a little extra vigor (“large” M. 9 clones like Nic. 29, M.26).

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Growing Season Models and Alerts:

<http://frec.cas.psu.edu>

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Southeast Region

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Invigorated Honeycrisp trees have greater incidence of poor red color and bitter pit. Maintain “calm” trees with moderate pruning, using primarily thinning cuts for light penetration. It is also critical to exercise restraint with nitrogen fertilizer (2% N by leaf analysis). Have a darn good reason for using ground-applied spring N fertilizer, or else don't do it! If leaf N is just a little low (1.8-1.9 leaf N), consider pre-bloom foliar nitrogen sprays to ensure adequate fruit set and early fruit growth.

Red Strains in the Future?

We have been evaluating red color formation in nine promising strains of Honeycrisp. In 2008, the top-worked trees of the selected Honeycrisp strains at the Penn State Fruit Research and Extension Center bore the first significant crop of fruit. The 2008 season was noteworthy for high temperatures during Honeycrisp harvest, which severely retarded red color development. Samples were collected from all nine advanced selections plus the standard control and evaluated for red color.

Two selections were shown to have more coloration than the others. One, labeled “B”, has been the elite selection every year since 2003 when we began fruit evaluations. The other, labeled “V”, has also scored highly in color ratings, and stood out from the other selections in 2008 despite the high temperatures at harvest. The standard selection was designated “S”. Sensory evaluations of these three selections were conducted at the Food Science Sensory Laboratory at Penn State University.

Eighty panelists evaluated whole apples of each selection for acceptability of the appearance, texture, flavor, and overall preference. Liking of the appearance for sample S was scored significantly lower than samples B and V. No other significant differences were found.

These results indicate that while both B and V were preferred for appearance, the panelists were unable to taste any difference in flavor or texture. This outcome means that we can explore the commercialization of these two strains without concern over impairing the very attributes (texture and flavor) that have made Honeycrisp so popular in the first place.

Crop Load Management

Fruit size, red color, consumer acceptance, and packer/shipper acceptance are negatively correlated with cropload. Thresholds for fruit size and color—3 inch diameter and 50% red—are achieved at ~7 fruits per cm² trunk cross-sectional area (TCSA; moderate crop load).

Color and packer acceptance dropped sharply above 8.4 fruits per cm² TCSA (moderately heavy crop load), showing that the tipping point between optimal crop load and quality is close *and* narrow. Chemical thinning to a moderate crop load is critical to the quality of this year's crop, and to adequate return bloom for next year.

Mature Honeycrisp is chemically thinned with 2 to 3 oz Fruitone + 1 qt carbaryl/100 gal/A. It is also very responsive to 6BA + carbaryl. Use caution when thinning young trees, as these are very sensitive to thinners, especially 6BA + carbaryl. Our trials show that Promalin at bloom thins Honeycrisp when daytime high temperatures are in the 70s.

If needed, follow-up hand thinning to make final corrections to crop load is justified by the value of this variety. Thinning down to a single fruit per spur is advised, as leaving fruits in clusters contributes to low fruit Ca in fruit.

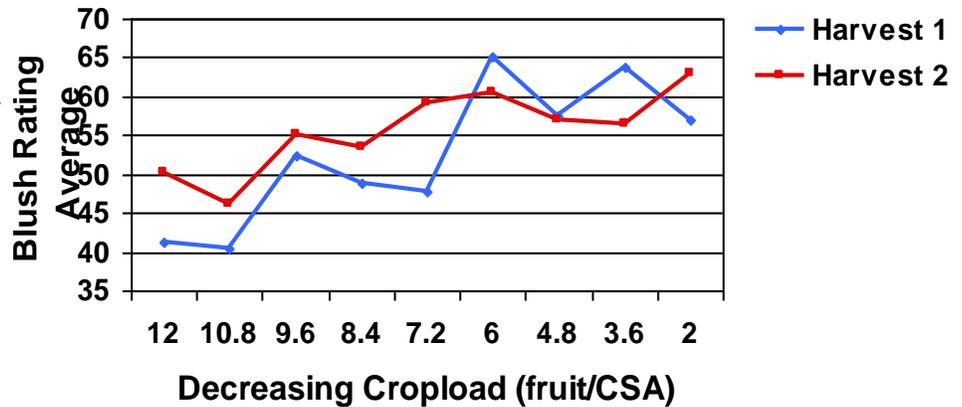
When Thinners Aren't Enough—Return Bloom Management

While some PGRs can stimulate return bloom, there are no substitutes for an adequate thinning program! The chemical thinners NAA and ethephon both promote bloom directly by stimulating ethylene production. The same two products can be used after thinning for promoting return bloom. NAA (Fruitone L, 2 oz/100 gallons), and/or Ethephon (1/2 pint /100 gallons) should be used for return bloom, with best timing as soon as the thinning window is over (25 mm fruit diameter). The spray schedule for Honeycrisp is to apply three weekly sprays, minimum, and these can be applied as alternate row middle sprays. Use a surfactant and plenty of water.

Bitter Pit

Honeycrisp is a large fruited variety, and very prone to bitter pit. This defect is worse on young trees because of the high level of vigor, and when the crop is light, such as in the off year in trees that have become biennial. Studies of the effect of foliar calcium sprays show that this strategy can reduce it. Our research results show that growers should use high-Ca fertilizer *frequently*. Early? Late? Answer: YES! In trees with adequate boron levels, supplemental B sprays gave no additional benefit over Ca. Our best reductions in pit were achieved when we applied six or more foliar calcium sprays, resulting in 6 to 8 lb Ca per acre per season.

Effect of Crop Load on Color Rating



A Note About Crop Load Management

Tom Kon, pomology graduate student, spoke at the President's Day Fruit Grower Meeting about a new tool for assessing crop load. The European manufacturer will not be marketing the tool (Equilifruit disk, shown on page 3) in the United States and so we are looking into other ways to make the technology available to our local growers. Stayed tuned!

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Bitter pit symptoms rapidly worsen in storage on susceptible large fruit from young vigorous trees, suggesting that fruit from lightly-cropped trees should not be held for even short-term storage. Other strategies for reducing bitter pit include: maintaining optimal soil pH with lime, avoiding over-applying N, K, or Mg, and maintaining adequate leaf B levels.

Disease Profile

While somewhat resistant to scab, Honeycrisp is very susceptible to powdery mildew and to summer rots. Chemical thinning, especially using NAA products when cool temperatures follow the application can result in mummies being retained on Honeycrisp spurs. Growers should monitor for these **retained mummies, as they create little “spore grenades” of summer rot inoculum.** Additionally, Honeycrisp growers are encouraged to maintain a good summer fungicide program. Honeycrisp is also susceptible to storage rots, which are compounded by its susceptibility to stem punctures.

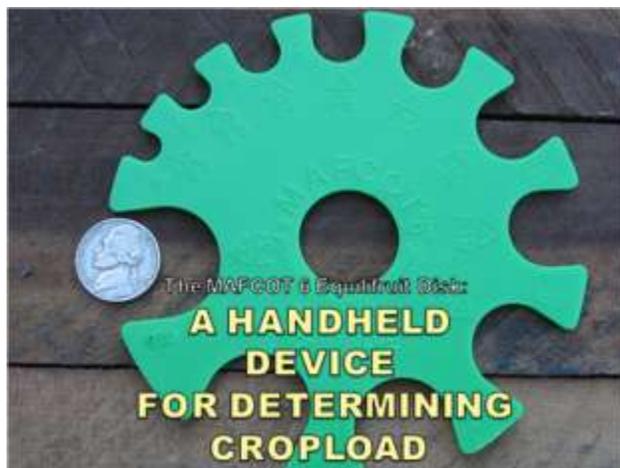
Harvest Concerns

Honeycrisp is prone to bruising and stem punctures. It ripens unevenly, and requires multiple picks. There is no reliable ripening index other than ground color. Fruit should be harvested when the background color breaks from green to pale (not butter) yellow. It is also prone to pre-harvest drop when the tree is stressed.

Honeycrisp harvest usually begins during the last week of August in southern Pennsylvania, and is completed by about September 7th unless treated with a stop-drop. Color and flavor are poor on earlier harvested fruit. Conversely, susceptibility to soft scald is worse on late harvested fruit.

The stop-drop and maturity management tool ReTain has a strong effect on Honeycrisp. ReTain delays pre-harvest drop, by delaying fruit maturity, so it can also delay the development of red fruit color. This effect can be lessened with Honeycrisp by using ReTain at the “heavy” half rates of 7 ounces per acre.

The other option for stop-drop is NAA (Fruitone L). Unlike ReTain, NAA delays fruit drop by blocking stem loosening, so color is not delayed. The best results on Honeycrisp can be achieved with split timings—two sprays of 4 ounces per 100 gallons each. Apply the first spray about one week before anticipated harvest and the second spray about five days after the first.



Soft Scald

Soft scald is a low storage temperature disorder, associated with rapid cooling of high respiring varieties, such as Honeycrisp. Soft scald incidence is increased by storage at 33°F compared with 37°F. Holding period at 50°F reduces soft scald development.

There seems to be considerable seasonal variation, with greater susceptibility in cool summers. Soft scald is controlled by harvesting fruit at proper maturity and holding period, or by not storing below 37°F for the first 6 to 8 weeks. Control of the disorder by higher storage temperatures is greatly **diminished in late harvested fruit.** Cornell recommends a starch index of 6 for closing. **Don't refrigerate late harvested fruit!**

Conclusions

Honeycrisp is a High Potential/ High Risk variety. However its challenges are production- and post-harvest-related, not marketing (yet). Difficult-to-grow varieties have profit potential for skilled fruit growers who are willing to go the extra mile to minimize the risks. While it requires attention to detail and hard work, production problems are something a grower can directly influence, as compared to marketing problems, where the individual grower has little influence. Our Land Grant Universities and commercial partners are geared to solving production problems, meaning that growers can obtain technical assistance and new tools to help them manage Honeycrisp production problems. A skilled, motivated grower is the key to success!

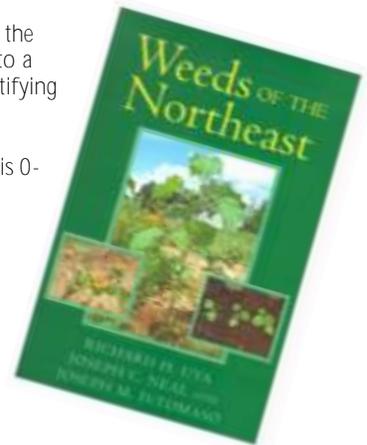
Acknowledgements:

The following scientists contributed to the research findings described in this article: Dave Rosenberger, Steve Hoying, and Chris Watkins, Cornell University; Randy Beaudry, Michigan State University; Rob Crassweller and Tara Baugher, Penn State.



Pennsylvania Tree Fruit Production Guide Updates

Weeds of the Northeast. At recent fruit meetings I talked about orchard floor management systems and mentioned the need to properly identify the weeds you are trying to control. I strongly urged all growers to have a copy or have access to a copy of the book titled *Weeds of the Northeast* by R. Uva, J. Neal, and J. DiTomaso. The book is a good reference for identifying weeds in your orchards. The book has color pictures of all the common weeds as well as descriptions of their life cycles. There are easy to use keys that will allow an individual to identify unknown weeds. The book is published by Comstock Publishing Associates, a division of Cornell University Press, and is available as a paperback edition. The ISBN number is 0-8014-8334-4. It is available on Amazon Books for about \$27.00.



New URL for Tree Fruit Production Guide. The web address for the *Pennsylvania Tree Fruit Production Guide* has been changed. The new 2010-11 edition of the guide is located at <http://agsci.psu.edu/tfpg>. The address listed on the inside cover of the printed copy of the new guide is incorrect.

New Herbicide Pruvin™. Recently MANA has released a new herbicide that was not available at the time of preparation for the new *Tree Fruit Production Guide*. The product is called Pruvin™. The active ingredient is not new to tree fruit production, as it is rimsulfuron. It is also the active ingredient in the product Matrix® manufactured by DuPont. The uses, rates, and restrictions are similar for both products. (Submitted by Rob Crassweller)

Tips for Successful Fruit Tree Planting

Dr. Rob Crassweller, Penn State Department of Horticulture

The investment in a new orchard is large, so it is important to do things right beginning with the planting year. Here are some tips to plant successfully:

- **Site preparation:** It takes at least one to two years to get a field ready for planting and probably longer on replant sites. During this period you need to improve drainage, add organic matter (cover crops, manure, or compost), adjust soil pH with lime if required, apply phosphorus, and control perennial weeds (which may take two years).
- **Nursery stock:** Work with your nursery to ensure the trees are delivered or ready for pick up when you need them. If you are going to pick the trees up at the nursery call in advance. Undoubtedly, when the weather is good in early spring many growers will want to plant. Trees should be kept dormant until planted, and roots should not be allowed to dry out. If planting is delayed, trees should be heeled into the soil, or kept in cold storage. DO NOT place trees in storages where apple fruit have been stored. Ethylene emitted by the apples can severely damage trees. Before placing trees in a cooler that was used for fruit storage be sure the cooler is aired out well. You should not smell any residual apple aroma.
- **Time of planting:** The earlier you plant the better. This allows the tree to establish new roots before the warm weather begins pushing the tree's growth and drawing large reserves of moisture. Fall planting can work for more southern sites in Pennsylvania. However, trees can be lost if the weather is too harsh during the winter, the trees are planted too late to become established, or weather is dry with little moisture. (A note from experience in 2005: We had an extended fall and against my better instinct I planted a few trees at Rock Springs. We lost about 30% of the trees. This was the one and only time I planted trees in the fall in my 26 years at Penn State.)
- **Method of planting:** Hand or mechanical planting can be successful as long as roots are given adequate room. If possible carry the trees to the field in large drums filled with water or soak trees overnight in water and only carry smaller lots to the field. The most important part is to re-adjust the tree height to ensure that the graft union is a uniform height above the soil line – after soil has settled. I usually recommend having the union about “3 fingers” above the final soil line. If the union is slightly below the soil, gently pull up on the tree to bring the union to the proper level.
- **Care after planting:** The roots need to come into intimate contact with moist soil after planting. Tamp the soil down firmly. If planting by hand fill the hole about halfway and then tramp the soil down. Fill in the remainder of the soil and tramp the soil down again. After the soil has been firmed up apply fertilizer around the root zone of the tree in a circle at least 5 to 6 inches away from the trunk. Avoid putting dry fertilizer in direct contact with roots or the trunk. Control weeds around the tree either by the use of approved herbicide or by mechanical pulling of the weeds.
- **Pruning vs. training:** For many years we thought that the top of apple trees needed to be cut back to balance with the loss of roots due to digging the nursery tree. However, with advances in nursery production (which result in better, more compact root systems), and the need for early apple production (which is delayed with pruning), many newly planted apple trees do not need to be pruned. The focus instead is on tying down all usable feathers, and providing the tree with all the water it needs early in the season. With apples, prune only limbs that are one-half or more the diameter of the central leader. In peaches to be trained to an open center select 3 to 4 limbs as your main scaffolds and head them back by one-half or to three buds.



Strawberry Mulching—That’s a Berry Good Question!!!

Kathy Demchak, Penn State Department of Horticulture



Left to Right: Strawberry plant with mild winter damage, and strawberry plant with no winter damage.

Q. I never got straw on my strawberry field this winter. After hearing Rich Marini’s talk at Hershey on winter injury, and reading his article on mulching and crown injury, maybe I should check some crowns. Assuming I can find the plants under the snow, can I check the crowns for winter injury during the winter? (Paraphrased from several growers)

A. I’ve only checked for winter injury in the spring and had no idea whether you could check during the winter, so I asked Rich. His answer was that you can, but the crowns may or may not show injury yet since the plants are still dormant. So, you can dig the crowns up now, but bring them inside for two or three days before cutting through them. Keep them

wrapped up so they don’t dry out, and then check for browning. He also pointed out that if you do already have injury, you can’t do much about it at this point, so waiting until spring to check still has its advantages.

As an additional note, on very old plants the lower crown areas will be brown even without winter injury, just because that part of the root system dies off over time. So, to help sort this out, in matted-row systems, it’s less confusing to check the crowns of daughter plants – that way you know that you are looking at crown tissue that would have been affected over this past winter. In plasticulture, if you just planted plug plants this past summer, all of the crown tissue will be relatively new. However, if you have only older dormant plants to check, it can be more difficult to tell what is going on, so check the past year’s crown tissue for browning. Usually that’s about the upper inch or inch and a half of the crown.

If you weren’t at Hershey, or missed the article that described winter injury symptoms, it was in the October 2009 Vegetable and Small Fruit Gazette, which you can access at <http://horticulture.psu.edu/cms/veg crops/files/gazetteOct2009.pdf> and in the Sept. 29, 2009 issue of the *Fruit Times*, which you can access at <http://fruittimes.cas.psu.edu/FT2809.pdf>.

Got a question? Chances are that someone else has the same question, but isn’t asking! Send your question to Kathy Demchak, at 102 Tyson Bldg., University Park, PA 16802, or via email to kdemchak@psu.edu. You will be credited with the question, or can remain anonymous, as you wish.

New Leadership at the Fruit Research and Extension Center

Dr. Bruce McPheron, Dean of the College of Agriculture, made the following announcement regarding new leadership of the Penn State Fruit Research and Extension Center:

I am pleased to announce Dr. James R. Schupp, Associate Professor of Pomology, has been named as Interim/Acting Director at the Fruit Research and Extension Center in Biglerville. In this role, Jim is responsible for providing visionary leadership and overseeing interdisciplinary operations at the Center until a permanent Center Director can be named.

In addition to these new leadership duties, Jim will be continuing his research and extension programs focusing on developing new production methods for improving grower profitability through increased revenues and production efficiency. Jim has a B.S. from Bowling Green State University, and M.S. and Ph.D. degrees from Ohio State University and joined Penn State in March 2004. We appreciate Jim’s willingness to assume this leadership position.



photo by S. Hollabaugh

Keep Work Exchange Programs in Mind for this Summer

Dr. Katie Ellis, Specialty Crops Extension Educator

As we gear up for the coming growing season, please consider participating in a grower exchange program. Gary Jones of Pipfruit New Zealand is coordinating the World Youth Exchange Program for apple and pear growers, and he is seeking participants to host young growers for learning and work experience at their farms. Last year, the Young Grower Alliance met Olivia McColl, a young New Zealand grower who participated in the program by staying at an orchard in Upstate NY. The exchangees typically offer a wealth of experience, and are eager to try new production techniques.

There are also opportunities for growers and horticulture students to work in other parts of the U.S. A grower in Western Montana is seeking a young grower to help him with management and marketing at a 12-acre orchard this summer. For more information about these opportunities, please call Katie Ellis at 717-334-6271 ext.331 or email kag298@psu.edu.



Planting a New Block of Apples? Buying Technology? Got Economics?

Wednesday, March 3, 2010
Penn State Fruit Research and Extension Center
290 University Dr., Biglerville, PA

Special Guest Presenters

Dr. Clark Seavert, Director and Professor, and Dr. James Julian, Faculty Research Assistant
Department of Agricultural Economics, North Willamette Research and Extension Center, Oregon State University

Agenda

- 8:00 a.m. What are the Three Main Criteria for Successful Orchard Renewal?
- 8:45 a.m. Are you a Cost Minimizer? Or a Profit Maximizer?
- 9:30 a.m. Break
- 9:45 a.m. Adopting Technology, Why or Why Not? A Focus Group Session
- 10:30 a.m. New Technologies Under Test in Pennsylvania Orchards
Larry Hull, Jim Remcheck, and Tara Baugher, Penn State
- 11:00 a.m. **Test Driving Agriculture's Profitability Tool - AgProfit™**
- 11:45 a.m. Wrap Up and Next Steps
- 12:00 p.m. Adjourn

How to Register:

Pre-registration will be appreciated!

You may register using one of three options:

Send the names and addresses of participants to:

Attention: Technology Workshop

Penn State Cooperative Extension – Adams County

Email: AdamsExt@psu.edu

Fax: (717) 334-0166

Call: (717) 334-6271 ext. 307

For more information, please contact:

Jim Remcheck, Penn State Extension Ag Economic Development/Marketing Educator, jar5006@psu.edu, 717-334-6271, ext. 321, or Tara Baugher, Penn State Extension Tree Fruit Educator, tab36@psu.edu



The focus of Clark Seavert's economics program is to help agricultural producers manage risk. The emphasis is to develop decision-making tools and provide training for agricultural producers who manage the financial, marketing, production, and human resource risks associated with specialty crops. This is accomplished by developing cost of production and cost of establishment studies. This information serves as the foundation to assess the profitability and feasibility of growing and establishing crops and implementing technologies that increase efficiencies and minimize environmental impacts.

Dr. Julian designs enterprise budgets, conducts applied research in production economics, and teaches workshops and short-courses. He also is involved in outreach to individuals in the North Willamette and Mid-Columbia regions helping them develop a better understanding of their markets and the economics of their operations.



This workshop is supported by a USDA-SCRI grant titled *Comprehensive Automation for Specialty Crops*.



Young Grower Alliance Specialty Crop Tour

Friday, March 19th

***Flinchbaugh's Orchard and Farm Market, York, PA
and Weaver's Orchard, Morgantown, PA***

grow
Innovation



Members of the Young Grower Alliance (YGA) are invited to a March 19th tour of two progressive specialty crop enterprises managed by young growers. *If you are a young grower and haven't yet joined the YGA, please take a few minutes to visit www.younggrowers.org to learn more about the group and how to participate!*

The tours will feature high density Honeycrisp plantings established through a Conservation Innovation Grant, high tunnels for strawberries and cherries, peach systems trials, blueberries on raised beds, and innovative layouts for on-farm markets. The intergenerational growers of these two operations have kindly agreed to share their progressive production and marketing strategies, ideas on crop diversification, and some thoughts on successful family enterprise transitions.



Join us for all or any part of the tour:
8:00 am – Meet at the Adams County Agricultural and Natural Resources Center to carpool with other YGA members
(<http://adams.extension.psu.edu/>)

9:30 am – Flinchbaugh Orchard and Farm Market Tour
(<http://www.flinchbaughsorchar.com/>)

12:15 – 3:00 pm – Learning Lunch and Weaver's Orchard Tour
(<http://www.weaversorchard.com/>)

We'll need a head count for lunch (sponsored by Pennsylvania and Maryland fruit grower associations), so please sign up by March 15th by contacting Katie Ellis, Penn State Extension Specialty Crops Innovations Educator (kag298@psu.edu; 717-334-6271).

The Young Grower Alliance is a coalition for those at the start of their horticulture careers looking to connect with others working in a similar profession and living a similar lifestyle. Activities include field trips, orchard tours, workshops, luncheons with guest speakers, and much more—limited by our own creativity!

New members are always welcome. For information on getting involved in the Young Grower Alliance, visit <http://www.younggrowers.org/> or contact Katie Ellis, kag298@psu.edu.

Upcoming Events

February 27 - March 3 - International Fruit Tree Association (IFTA) Annual Conference; contact Rick Dungey, (636) 449-5083, dungey@ifruittree.org; www.ifruittree.org

Tuesday, Mar. 2—Snyder County Fruit Growers Educational Meeting; Contact John Esslinger, cje2@psu.edu, 570-837-4252

Wednesday, Mar. 3—Southeast Region Fruit Growers Educational Meeting, Leesport; Contact Andy Beck, awb123@psu.edu, 570-622-4225

Wednesday, March 3 - Got Economics? Meeting, Penn State Fruit Research and Extension Center, Biglerville, PA, 8:00 a.m. - Noon; pre-register at (717) 334-6271 or email: AdamsExt@psu.edu

Thursday, March 4—Lackawanna County Fruit Growers Educational Meeting; Contact John Esslinger, cje2@psu.edu, 570-963-6851

Friday, March 19 - Young Grower Alliance (YGA) Specialty Crop Tour, Contact Katie Ellis, (717) 334-6271, kag298@psu.edu

If you missed the winter fruit grower educational meetings, the PowerPoint presentations are posted at:

<http://frec.cas.psu.edu/Presentations.html>



View *Fruit Times* on the web at:
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