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Apple: Pixie Crunch are developing good color



Grape: Full veraison on most varieties

Crop Conditions

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323) & (Bruce Bordelon, bordelon@purdue.edu, (765) 494-8212)

Apple harvest has begun with early varieties still being harvested. A lack of cool nights has delayed red color development but many varieties are still developing acceptable red color. Quality generally looks good.



Blackberry (primocane): fruit developing well despite severe Japanese beetle damage

Physiological Disorders

(Janna L Beckerman, jbeckerm@purdue.edu, (765) 494-4628)

With weird weather often comes weird physiological disorders (on top of our summer fruit rots). Often confused with hail injury, disease or insect damage, these physiological disorders are marring the appearance of many apples.

Symptoms of bitter pit include circular or even irregular sunken spots on the fruit surface, beneath brownish or streaked dead regions (Fig. 1). Note that the damage can be separated from the skin surface. Symptoms may be mistaken for

hail damage, or any of the below problems. A key diagnostic feature is that hail usually affects only one side of the fruit, whereas bitter pit is more severe on blossom end of the fruit. Some varieties, like Honeycrisp, are more prone to this disorder, whereas hail will impact (literally) all varieties of fruit. Bitter pit can show up throughout the orchard, not just the edges.



Fig. 1. Bitter pit and lenticel rot often appear at the calyx end of the fruit. Photo by Janna Beckerman

Cork spot is another physiological disorder affecting outer portion of the fruit, and symptoms begin on the fruit flesh as small dimples or depressions. This disorder begins developing in June, and continues throughout the growth and enlargement of the apple. Lesions enlarge and develop 1/4 to 1/2 inch corky, discolored areas into the flesh of the apple. Unlike bitter pit, the corky spots may occur anywhere on the fruit flesh. It is important to note that all of these problems are only surface blemishes.

Unfortunately, their unattractive appearance often reduces the marketability of the fruit.

Both disorders can be mistaken for brown marmorated stink bug injury (BMSB) (Fig. 2). BMSB usually appears around the edges of the orchard, although I do question their literacy skills and their ability to follow directions. BMSB

can occur all over the apple, and more around the shoulder than the calyx. There should be a ‘sting’ in the center of the depression—this is a key diagnostic feature. Cornell has a really nice blog post by Peter Jentsch here: <http://blogs.cornell.edu/jentsch/2014/09/18/bmsb-update-assessing-fruit-damage-at-harvest-is-it-hail-bitter-pit-apple-maggot-or-stink-bug/>

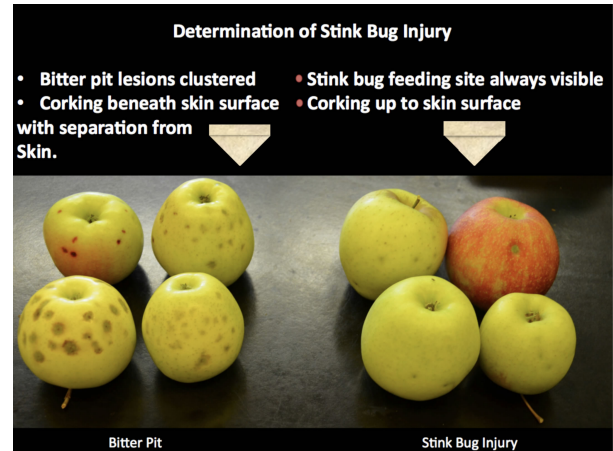


Fig. 2. Comparison between bitter pit and BMSB. Photo by Peter Jentsch

You can perform preharvest sampling for bitter pit: Two weeks prior to harvest select large fruit and dip the fruit in a solution of 2,000 ppm ethephon in water (about 1 ½ teaspoons of ethephon to one gallon of water) to hasten the ripening. Hold the fruit for two weeks at room temperature. Should bitter pit develop, delay harvest for as long as possible, being sure to cool harvested fruit immediately, and delaying packing for as long as possible (preferably four weeks). During the delay, bitter pit will develop in the affected fruit, which can then be removed during the packing process.

For those that have had problems with these disorders: Bitter pit, cork spot and Jonathan spot are complex problem that require an integrated management scheme to reduce the problem to acceptable levels. It is very simple to say “just add more calcium” but the reality is more complex. Calcium isn’t as soluble as potassium or magnesium, making it less readily available to the plant. High levels of nitrogen, potassium, and

magnesium compete with and reduce the fruit uptake of calcium. Furthermore, applications of nitrogen preferentially drive shoot growth over fruit growth, also reducing available calcium. Finally, high levels of available water can increase fruit calcium if shoot growth is not excessive, and drought prevents nutrient uptake that is needed to assure proper fruit development. That said, one study found, at least for 'Honeycrisp', the addition of calcium alone was beneficial (Rosenberger et al. 2004). Another nutrient issue on postharvest rots is excessive nitrogen use. Not only is judicious N use prudent to minimizing the risk of fire blight, but excessive N results in fruit that are predisposed to postharvest problems, compared to the lower N counterparts. Finally, in addition to 'Honeycrisp,' other susceptible varieties include 'Baldwin,' 'Gravenstein,' 'Grimes Golden,' and 'Northern Spy.' 'Golden Delicious' is considered moderately susceptible, while 'Delicious' and 'Winesap' are fairly resistant.

At this point, other than delayed harvest, all you can do is plan for next year. Bitter pit, cork spot and Jonathan spot can be remedied with calcium chloride at 2 pounds per 100 gallons of water (or 1.5 tablespoons per 1 gal. water) applied in four sprays beginning two weeks after full bloom and continuing at 10 to 14-day intervals thereafter to reduce cork spot. At this rate, calcium chloride may be added to pesticide sprays normally used in controlling post-bloom diseases (or insects) affecting fruit. Do NOT apply calcium chloride sprays when temperatures are above 85 degrees F. Calcium chloride is highly corrosive—be sure to rinse sprayer thoroughly after use. As nitrogen management is also implicated in this disease, reduce excessive shoot growth by not applying (or greatly minimizing) nitrogen to the soil of apple trees for at least one year. Evaluate results at the end of that season; in the second year, use ½ the recommended amount of N, and evaluate

harvest again.

References and additional information:

Bitter pit control in apples. Available online at: <http://www.omafra.gov.on.ca/english/crops/facts/00-009.htm>

Rosenberger, D.A., J.R. Schupp , S.A. Hoying , L. Cheng, and C.B. Watkins. 2004. Controlling Bitter Pit in 'Honeycrisp' Apples. HortTechnology 14(3) 342-9.

<http://horttech.ashspublications.org/content/14/3/342.full.pdf>

Strawberry Fruit Bud Development

(Bruce Bordelon, bordelon@purdue.edu, (765) 494-8212)

June bearing strawberries are “short day” plants that initiate flower buds in response to short days (less than 14 hours day length). Day length for Indianapolis drops below 14 hours about August 10. As we get into late summer, strawberry plants respond to shorter days by setting the flower buds that will result in the crop next spring. It is important to maintain appropriate nutrition and soil water status during this time. General recommendations are to fertilize strawberry fields with 20 to 50 pounds of actual nitrogen per acre per during late summer. Nitrogen rates depend upon amount supplied at renovation and plant vigor. New fields with high vigor may not need additional nitrogen now, but older fields should benefit. Irrigation during this time is also extremely important if rainfall has not been sufficient in your area. We suggest about 1 inch per week. Continue to irrigate strawberries through fall to assure a good crop next year.

Grape Harvest – 2018

(Bruce Bordelon, bordelon@purdue.edu, (765) 494-8212)

Grape harvest is just about to get started in the southern part of the state. Growers will start harvesting early varieties next week. Most varieties are slightly ahead of normal this year. In Lafayette, early varieties are at full veraison and should be ready to harvest in the next couple of weeks. We generally harvest early varieties such as Brianna, Edelweiss and Prairie Star about the third week of August and many other early varieties starting the first week of September. Depending the weather for the next couple of weeks, we might be a bit early this year. Fruit quality overall is very good. The cooler conditions lately have favored fruit quality.

With wine grapes, all fruit of a given cultivar is typically harvested from the vineyard or block at a single time to coordinate winery activity and to reduce costs. It is important to plan carefully so that the harvest date coincides with the optimum fruit quality.

Fruit quality is comprised of several factors, most importantly sugars, organic acids, and pH. Other factors such as phenolics, anthocyanins, aroma and flavor compounds are also very important to wine quality. And of course, freedom from rots is an important consideration. Unlike some other fruits, grapes do not continue to ripen after harvest. Consequently, it is important to harvest grapes at the peak of quality and with the desired parameters for the intended use.

Most vineyards have some degree of variability in soil type and drainage, sunlight exposure, wind, insect and disease pest, nutritional status, etc. Fruit from different parts of the block, from adjacent vines, as well as from different parts of the same vine can vary. Much of the variability is reduced with proper vineyard management, e.g. cluster thinning, shoot thinning, canopy management, etc.

As harvest nears, it is very important to monitor grape chemistry. Growers should sample weekly leading up to harvest with a protocol to collect a representative sample of fruit from the entire vineyard. This can be a sample of 200 berries per block collected from vines randomly, but with emphasis on collecting berries from top, middle and bottom of clusters, and from exposed and shaded clusters. Some growers prefer to collect a sample of 5 to 10 whole clusters per block rather than individual berries to capture the variability within clusters. Often sampling occurs from a few select “cardinal” vines in a block, chosen for their average performance overall. Whatever approach is used, be sure to compare your sampling results to the actual final harvest juice parameters at the press to determine the accuracy of your sampling. Most of the time pre-harvest samples tend to over estimate the level of fruit maturity, but not always.

Wine grape growers should have the ability to measure sugar content (with a refractometer), titratable acidity and pH (with a pH meter and burette). Equipment and supplies to measure these parameters can be purchased for about \$500. Each of these factors is important for determining proper harvest time, but none alone can accurately estimate overall fruit quality. It is the balance of sugars, acids and juice pH that is important to the wine maker. And of course, there are the subjective qualities of seed and skin maturity, tannins, anthocyanins, flavors, aromas, etc. The Berry Sensory Analysis method addresses evaluation of these more subjective factors such as skin, pulp and seed maturity. More needs to be done to adapt the method for use with our Midwest varieties, but as a descriptive tool, it can be an excellent way for growers to go beyond the basics of sugar, acid and pH. Work with your winemaker/buyer on harvest decisions as much as possible.

As harvest nears every grower begins to worry about what can go wrong. Birds, raccoons, deer, etc can all take a toll. More importantly, berry skin cracking from rain, bird pecks and bee damage can lead to sour rot caused by yeasts and vinegar spoilage bacteria. The vinegar (acetic acid) leads to high volatile acidity levels in the wine. We experience major problems with sour rot in wet years. So far, we have not had major problems this year. Let's hope the weather continues to cooperate. Growers need to closely monitor for development of sour rot, especially if rains occur near harvest, and take measures to reduce the spread by managing fruit flies and microbial organisms. We discussed sour rot management at the summer IWVA meeting. Contact me if you want a refresher. Ultimately it may be necessary to develop a strategy to minimize harvest of rotted clusters. A pre-harvest walk through the vineyard block should identify any clusters with sour rot and those lagging in ripeness. In most cases, late clusters will never catch up to the rest, and will only reduce the overall quality of the crop at harvest. Now is a good time to drop any undesirable fruit. Don't expect your harvest crew to sort as they pick. Go through beforehand and eliminate the guesswork.

Purdue Fruit and Vegetable Grower Mail Lists

(Bruce Bordelon, bordelon@purdue.edu, (765) 494-8212)

With harvest around the corner for many fruit crops, I thought this would be a good time to remind readers about our email lists. Various forms of social media is used by just about everyone in today's society. While Facebook and Twitter are much more commonly used than email, there is still a place for email lists. Mail

lists continue to be a successful communication tool for groups of people.

The way a mail list works is that people subscribe and then have the authority to post messages to the list. All other subscribers on the list receive the messages. One message can be sent to hundreds of readers at once. Replies to messages on a mail list can either go only to the sender of the message or to the entire list.

Purdue HLA Extension maintains two mail lists for users. The "Fruitveg" list is for all fruit and vegetable growers, farm marketers, etc. in Indiana and surrounding states. The "Winegrape" mail list is primarily for the Indiana wine industry. Anyone can subscribe to either list. Once subscribed users can post messages to the list. Our lists are set so that replies go only to the sender. If you prefer to reply to everyone on the list, hit "reply all" and check to see that the list address is in the send box.

The mail lists were established to allow Indiana fruit and vegetable growers, wine grape growers and wineries, and farm marketers to interact with each other electronically. Growers and marketers have been using this forum for free and open exchange of information and ideas. The list are used to coordinate group purchases of equipment and supplies, and as a forum to buy and sell produce and used equipment and supplies. Each year grape growers post grapes available and many wineries have used the site to sell used equipment. We encourage all growers to subscribe to the lists.

To subscribe to the lists, click on the links below.

Commercial Fruit and Vegetable - The Fruitveg mail list is for Indiana fruit and vegetable growers, and farm marketers to communicate electronically.

Wine and Grape Production - The Winegrape mail list is for Indiana and regional grape growers

and winemakers to communicate electronically. While we do not moderate the lists, we watch activity. We do not allow personal vendettas, inflammatory comments or other inappropriate use of the list. Any statements made do not represent “official” opinions, and Purdue University takes no responsibility for content.

Annual Strawberry Production in Southern Indiana

(Wenjing Guan, guan40@purdue.edu)

Strawberries are primarily grown in the matted row system in Indiana, in which bare-root strawberry plants are set in the spring, fruit is first harvested in the second year and plantings are renovated each year for a few seasons. Growers in Southern Indiana have expressed interest in growing strawberries in the annual plasticultural system. With this annual system, plants are set in the fall and harvested in the spring of the following year. Plantings are not normally carried over a second year. Although the annual plasticultural system is very popular in the southern states, its usage is limited in Indiana mainly because our short fall weather conditions pose a challenge for strawberry plants to develop enough branch crowns, which allows them to achieve the optimal yield in the following spring.

In the past two years, we have been testing the annual strawberry production system with additional protection from high tunnels and low tunnels at the Southwest Purdue Ag Center in Vincennes, IN. Although we are far from coming to a conclusion about the production system in Southern Indiana, I would like to share with you some of the facts we have learned in this journey.

Plant materials

The most commonly used strawberry plant

materials are bare-root strawberry plants and strawberry plugs. Strawberry plugs are more expensive than bare-root plants. However, plugs survive better, grow faster, and establish earlier. They are suitable for mechanical transplanting with a water-wheel. This is particularly beneficial for large-scale planting. Easy transplanting is also an advantage for less experienced growers.

Strawberry plugs are normally not available until the end of August. Sometimes, it is a dilemma whether to plant them in late summer. It is true that any of the warm days in the end summer and fall are very good for plant growth. But on the other hand, extremely high temperatures (above 95 °F) can cause plant leaf burn (Figure 1) and eventually kill the plants. This could particularly be a problem in high tunnels.

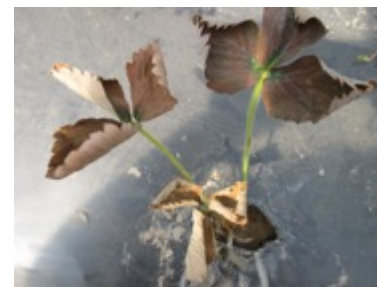


Figure 1. A severe case of plant leaf burn under high temperatures.

To attain the same plant growth in the fall, bare-root strawberry plants should be planted 1-2 months earlier than the plugs. It is important to note that bare-root plants do not have an actively growing root system, in addition, they are planted in the middle of summer. Continuous overhead watering in the first week following transplanting is essential to ensure plant survival.

Day-neutral and June bearers

Most strawberries grown in Indiana are June bearing, or short-day plants. Interest exist among growers in day-neutral strawberries for extended season production. However, in the experimental trials we have done in Southern Indiana, we did not see a dramatic benefit in terms of season extension with day-neutral strawberries. Day-neutral cultivars could produce some fruit in the fall, but the yield is normally too low to justify the labor cost. It is also true that day-neutral strawberries can be continuously harvested in the summer, but the temperature is usually too high to allow the plants to produce high quality berries. Using shade cloth may help to solve the issue. This is an idea that we would like to test in our future trials. So far, growing a combination of varieties with the different flowering habit, and the use of season extension tools, such as high and low tunnels, row covers, etc. is recommended to extend the harvest period.

Winter cold and Spring frost protection

In general, we recommend use floating row covers for the annual strawberry production system (Figure 2). Although row covers are much more expensive than straw mulch, benefits gained from using row covers can normally justify the cost. First, row covers can be easily removed and recovered. If strawberries were grown inside high tunnels, the plants would benefit from additional growth in late winter if row covers were removed in sunny days and covered back at night. In the open field, it is not recommended to remove row covers in the winter, but temporarily removing and recovering the plants is needed to protect blooms from late frost in the spring. Secondly, compared with straw mulch, strawberry plants covered with row covers normally develop faster in the spring which leads to early yields.



Figure 2. Strawberry plants were covered with straw mulch and row covers in the winter

It should be noted that straw mulch is more effective at retaining heat compared with row covers when temperature is extremely low in the winter. A detailed comparison of winter temperatures under straw mulch and row covers can be found in this article

<https://vegshotline.org/article/strawberry-winter-protection-straw-mulch-vs-row-covers/>

Upcoming Events

(Lori K Jolly-Brown, ljollybr@purdue.edu)

August 30, 2018 Small Farm Education Field Day

Purdue Daniel Turf Center

Contact Lori Jolly-Brown, ljollybr@purdue.edu or 765-494-1296

Register here: <http://www.cvent.com/d/hgqx6g>

September 5, 2018 Greenhouse & Indoor Hydroponics Workshop

Purdue University, PFEN 1159 & Purdue Horticulture Greenhouse

Contact Lori Jolly-Brown ljollybr@purdue.edu

Register here: <https://tinyurl.com/yaxd4k2z>

September 24, 2018 Purdue Fall Winegrape Workshop

From Vineyard to Winery. Registration info and

itinerary coming soon! Save the date!

Contact Jill Blume blume@purdue.edu

October 17, 2018 Indiana Flower Growers Conference

Daniel Turf Center

Contact Lori Jolly-Brown ljollybr@purdue.edu

January 8, 2019 Illiana Vegetable Growers Symposium

Teibel's Family Restaurant, Schererville, IN

Contact Liz Maynard emaynard@purdue.edu
<https://ag.purdue.edu/hla/Extension/Pages/IVGS.aspx>

February 12-14, 2019 Indiana Hort Congress

Indianapolis Marriott East Indianapolis, IN

Contact Lori Jolly-Brown, ljollybr@purdue.edu
or 765-494-1296

<http://www.inhortcongress.org>

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Editor: Peter M Hirst | Department of Horticulture and Landscape Architecture, 625 Agriculture Mall
Dr., West Lafayette, IN 47907 | (765) 494-1323