

FANCY FRUIT

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A Newsletter for Commercial and Advanced Amateur fruit growers.

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Crop Conditions

(Chloe Richard, richa267@purdue.edu)



Watermelons- second harvest completed this week



Plums- harvested 1-2 weeks ago



Pears- maturation



Apple: (Rosalee): maturation



Grapes- early varieties ready to harvest



Primocane Fruiting Blackberry- flower to green fruit

Short-term Drought Relief, Forecast Turning Hot, Dry Again

(Austin Pearson, pearsona@purdue.edu)

Over the last 30 days (July 18-August 15), the state average temperature was 73.5°F, which was essentially normal. Average temperatures ranged from 0.9°F below normal in northwestern Indiana to 0.5°F above normal in southern Indiana (Figure 1). The heat was not missing, though, as July 26 through 28 was rather warm across the Midwest. Minimum temperatures ranged from 4 to 9°F above normal statewide during this period. There were 240 daily high maximum and minimum temperature records broken or tied across the Midwest in late July, with most of Indiana’s broken records occurring as minimum temperatures (Figure 2). August temperatures were near normal until the last few days as cooler temperatures returned to the area. On Monday, August 14, I actually had to break down and buy a sweatshirt (8/14) as I forgot mine at home! Modified Growing Degree Days (MGDDs) have accumulated between 1500 and 2650 units in Indiana, which was near normal (Figure 3). MGDDs have accumulated as expected throughout the growing season.

The bigger story, though, has been the return of rain. It seemed at times this year that we could not buy a drop of rain. Since early July, though, we have had several storm systems bring broad precipitation across the state. Over the last 30 days (July 18-August 15), the state averaged 5.13 inches, which was 1.24 inches above normal or 132 percent of normal. Locally higher amounts occurred as strong storms resulted in heavy precipitation totals. Portions of Franklin and Putnam Counties had areas that received 8 to 10 inches of rainfall, which was more than 200

percent of normal (Figure 4). Flooding was observed in Franklin County and tragically resulted in a casualty.

Fortunately, Indiana is essentially drought-free with the release of the August 15 US Drought Monitor (Figure 5). Lingering abnormally dry (D0) conditions exist in west-central Indiana, which signals going out of drought and is not technically considered drought. Compared to last week, there was a 6.31% decrease in areas of Indiana in Moderate Drought (D1).

The Climate Prediction Center (CPC) has elevated confidence in above-normal temperatures and below-normal precipitation for the next two weeks (Figure 6). The CPC also has a slight risk for excessive heat next week, as modeled temperatures show heat in the mid to upper 90s (Figure 7). I would not be surprised to see temperatures breaching 100°F in southern Indiana, which, coupled with the lack of precipitation, may escalate drought concerns by the end of August.

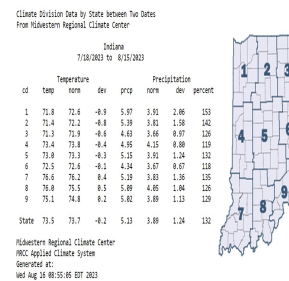


Figure 1: Climate Division data by state, between July 18 and August 15, 2023, which includes observed temperature and precipitation, normal temperature and precipitation and percent of normal precipitation.

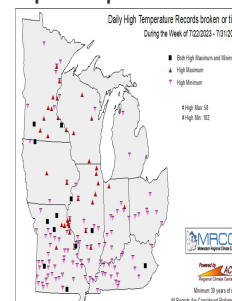


Figure 2: Daily high temperature records that were broken or tied during the last week of July 2023.

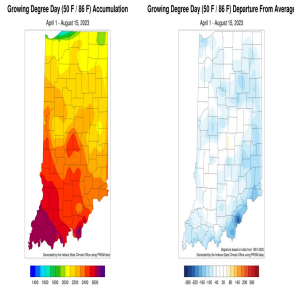


Figure 3: Total Accumulated Indiana Modified Growing Degree Days (MGDDs) April 1-August 15, 2023 (left) and Total Accumulated MGDDs represented as the departure from the 1991-2020 climatological normal (right).

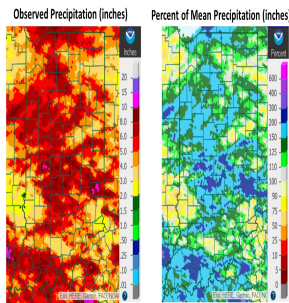


Figure 4: Observed precipitation and percent of mean precipitation for July 18-August 15, 2023 from the Advanced Hydrologic Prediction Service.

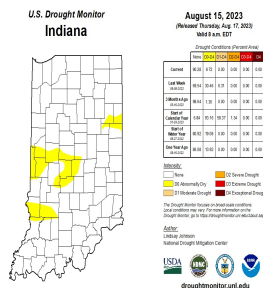


Figure 5: August 15, 2023, US Drought Monitor. The US Drought Monitor is released every Thursday morning by 8:30 AM.

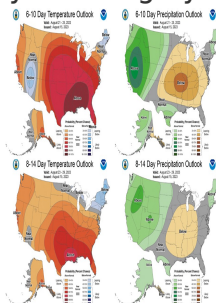


Figure 6: CPC 6-10 day temperature and precipitation outlooks for the United States, valid August 21-25, 2023 (top). CPC 8-14 day temperature and precipitation outlooks for the United States, valid August 23-29, 2023 (bottom).

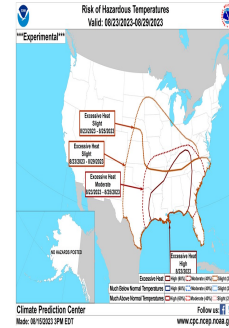


Figure 7: CPC Risk of Hazardous temperatures for August 23-25, 2023.

Figure 4 weblink: [Advanced Hydrologic Prediction Service](#)

Figure 5 weblink: [US Drought Monitor](#)

Strawberry Plug Production at Kube-Pak

(Wenjing Guan, guan40@purdue.edu)

I visited Kube-Pak (Allentown, NJ) during North American Strawberry Growers Summer Tour. Kube-Pak wholesales bedding plants, plugs, potted plants and more. Our visit is at Kube-Pak's peak time of strawberry business. Mr. Rob Swanekamp showed us the steps of growing strawberry plugs, from tip production to shipping. The strawberry plugs' shipping date starts in mid-July and last until the end of September. The relatively early shipping date would provide a great opportunity for Indiana strawberry farmers interested in growing strawberries with plasticulture system.



The steps of growing strawberry plugs at Kube-Pak (Allentown, NJ)

A. Tips are harvested from mother plants grown in hanging baskets in greenhouses. The mother plants were established from bare-root plants. The process started in April and lasted for about 20 weeks. B. Harvested tips were placed into 50-cell trays with moisture potting soil. C. The newly potted tips were grown in the misting area for 10 days. D. The plants have well-developed root system in three weeks. E. Workers check every tray and every plant for quantity control. F. Trays are individually packed and ready to ship.

Control Of Preharvest Drop with NAA

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323)

Control Of Preharvest Drop with NAA:

Preharvest drop refers to the process where fruit fall from the tree prior to harvest. Not all apple varieties are affected, but with some, such as McIntosh and Pristine, pre-harvest drop can be extreme. Several growth regulator materials are available to growers to help reduce pre-harvest drop. These materials are often referred to as “stop-drop” or “sticker” sprays. The traditional material used to help prevent pre-harvest drop on apples is NAA (Fruitone N), a synthetic auxin. Other synthetic auxins you may have heard of include 2,4-D and 2,4,5-T. Of course you also know Fruitone N as a chemical thinner. Early in

the season NAA knocks fruit off the tree and later towards harvest it sticks them on. This highlights the importance of timing when using plant growth regulators.

Another newer stop drop material is ReTain (see articles by Schupp and Schwallier in this issue). Although both NAA and ReTain can reduce preharvest drop, they do this in different ways. ReTain delays apple maturity whereas NAA does not delay maturity (and may even hasten it) but just reduces the fruit dropping. As Dr Schupp highlights in his article, ReTain must be applied well ahead of the anticipated harvest date so a considerable amount of planning is required. NAA on the other hand needs to be applied just before apples start dropping, so in this regard can be viewed as a rescue treatment.

Once NAA is applied it takes about 3 days for the activity to kick in. After that you can expect about 7 days of drop control. Rates of 10-20 ppm are usually effective, but knowing exactly when to apply it can be tricky. If the application is made too soon, the effect may wear off before harvest is complete. If the NAA is applied too late, then too many apples will have dropped on the ground before the NAA starts having an effect. Wait until you start to see a few apples drop, and perhaps assist this by bumping a few branches and seeing if any apples drop. Then it's time to apply the NAA. Longer stop-drop control can be obtained with a split application, 10 ppm applied 7-14 days apart. NAA works best when applied in slow drying conditions and when temperatures are warm (70-75F). Bearing this in mind, many growers apply their stop drop sprays early in the morning when there may be some dew on the trees and when temperatures are rising. Be aware that high rates of NAA (20 ppm) can advance fruit maturity.

NAA can be tank mixed and is compatible with a wide range of products. Always conduct a small

test before mixing NAA with materials you haven't tried previously. Apply in enough water to ensure good coverage. (Hirst)

Timing Retain Sprays: ReTain (AVG) is a plant growth regulator that blocks the production of ethylene. When ReTain is applied to apple, several ripening processes are slowed, including preharvest drop, fruit flesh softening, starch disappearance, and red color formation.

In order for ReTain to be effective it must be applied well in advance of the climacteric rise in ethylene production that signals the onset of fruit maturity. If applied too early the effects may wear off prematurely. If applied too late, a significant portion of the crop may not be responsive to AVG, having already begun to produce autocatalytic ethylene. A second reason for avoiding late applications of ReTain is the 21 day preharvest interval (PHI), which, combined with a late spray date could result in an undesirable delay in harvest.

The label recommends applying ReTain four weeks before anticipated harvest (WBH). This has sometimes caused confusion, as the grower is timing the spray relative to some future, unknown date. A more scientific basis for timing would be to state that ReTain should be applied four weeks before the natural climacteric rise in fruit ethylene, but this is still a future event with an element of uncertainty. The good news is that there is a fairly wide window when ReTain can be applied with optimal results, and a fairly easy way to determine when to apply it.

The best application window for ReTain is about 10 days wide and centered on the 4 WBH date. For early season varieties, such as Gala and McIntosh, start by estimating when you would normally expect to begin harvesting the variety if no ReTain or ethephon (Ethrel, Ethephon II) were used. Now take into consideration the season. Adjust the anticipated harvest date according to

how early or late you estimate the season is, then count back four weeks on the calendar. Now mark the calendar from that date through the next seven days. This is your application window for that early season variety.

Watch for good spray conditions with at least six hours drying time within that week and apply the material at the first opportunity. Congratulations! Your ReTain is on at the right time.

Now mark your calendar for 21 days after the spray was applied. This is the PHI, as required by the label. You can't legally harvest before this date.

Repeat the same thought process for later varieties, but keep in mind that later varieties are usually less affected by seasonal variation in maturity than stone fruits or early apple varieties. It is usually unnecessary to account for seasonal variation in fruit maturity for Empire and later varieties. (Dr. Jim Schupp, The Fruit Times, Penn. State University)

Determining apple maturity

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323)

Making the decision on when to harvest can be a very tricky and complicated issue. The longer you intend to store the fruit, the more precise your timing needs to be. For summer apples, most growers only intend to store fruit until their higher quality fall apples come on stream, so storage times beyond a week or two are not that common. For example, very early season apples such as Lodi and Pristine should only be stored for a few weeks until Gala harvest begins. Even for fall apples, many Indiana growers aim to sell the majority of their crop immediately to the consumer, and try to be done by mid November or so. Since storage times are relatively short,

harvest maturity is less important than for longer term storage. This being the case, apples should be harvested when they are fully ripe. This will maximize their flavor, and although it reduces their storage potential, this is not too important for many direct market growers. There are various tests for measuring fruit maturity and degree of ripeness, but taking a bite out of a few apples will give a good enough indication for fruit being stored for short periods where flavor is important but storage life is not. Obviously, this also applies to apples intended for U-pick.

Bear in mind that even in cold storage, fruit continue to ripen, just at a slower rate.

Therefore, fruit intended for longer term storage should be harvested when they are less ripe. There is no single test that will give you the precise answer but factors such as calendar date, heat unit accumulation, fruit firmness, soluble solids concentration, starch content and ethylene evolution all give answers to a piece of the puzzle. As you can see, this gets complicated real fast. In fact, states with large apple industries have labs dedicated to performing these tests and measurements are fed into complex mathematical models to determine the optimum harvest time for fruit for long-term storage.

Beyond the taste test, if you are going to perform one test I suggest looking at starch index. As fruit ripen, enzymes convert starch in the fruit to soluble sugars, which explains why fruit become sweeter as they ripen. This test provides an estimate of how much of the starch in the apple has been converted to sugar. So, in Figure 1, the fruit with a rating of 0 (completely black) are full of starch and not ready to be harvested. The fruit with a rating of 6 have almost complete conversion of starch to sugar and are ready for immediate consumption. For short-term storage or immediate sale, harvest fruit when they have

a starch index of 4-6. This test is quick, easy, and doesn't require expensive equipment. For more details look in Chapter 7 of the Tree Fruit Pest Management Handbook, ID-93, available at <http://www2.ca.uky.edu/agc/pubs/id/id93/id93.htm>

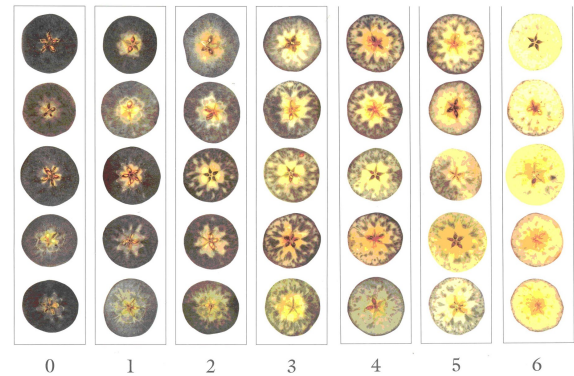


Figure 1. Chart showing starch pattern index. Fruit with a rating of 0 have a lot of starch which is stained black by iodine. Fruit with a rating of 6 have had virtually all their starch converted to soluble sugars, so are more ripe and sweet.

Keep an Eye out for Spotted Lanternfly

(Miranda Purcell, mrpurcel@purdue.edu)

The Spotted Lanternfly is an invasive planthopper native to East Asia. It was introduced to the US in 2014 in Eastern Pennsylvania and has since spread to 13 other states including Indiana. The Spotted Lanternfly has 70+ host species including the invasive Tree of heaven (*Ailanthus altissima*), grapes, apples, stone fruit, vegetables, hops, walnuts and hardwood trees. Thus far, vineyards have been the most adversely affected agricultural commodity. The Spotted Lanternfly is known as a hitchhiker species because it lays eggs on almost any surface, including vehicles, trailers, outdoor equipment and patio furniture, and the eggs can be spread long distances when these items are moved.

Early detection is critical for stopping the pest from spreading, and you can play a key role in detecting this insect. At this time of year, the insects are at their most recognizable stage as colorful winged adults ~1 inch long.

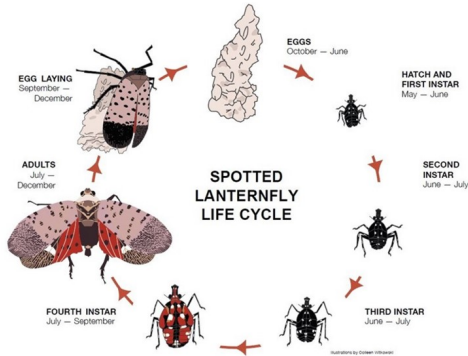


Figure 1. Life cycle of the Spotted Lanternfly. Photo from Penn State Extension



Figure 2. Adult Spotted Lanternfly. Photo from USDA

Anyone that spots signs of the spotted lanternfly should contact DEPP by calling 866-NO EXOTIC (866-663-9684) or send an email to DEPP@dnr.IN.gov. For more information on this or other invasive pests see the following

link <https://www.in.gov/dnr/entomology/pests-of-concern/spotted-lanternfly/>

For further information: [USDA | Spotted Lanternfly](#), [Penn State Extension | Spotted Lanternfly](#), [Spotted Lanternfly Management in Vineyards](#), [Spotted Lanternfly Now in Northern & Southern Indiana](#)

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