

Cornell University  
Cornell Cooperative Extension  
Eastern New York Commercial Horticulture

# Vegetable News

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## Cool Temps Slow Down Tomato Ripening

Teresa Rusinek—ENYCHP

Growers across the region are experiencing slow ripening of tomato fruits and this season it's not due to excessive heat. Back in May, temperatures were too cold for most growers to put tomatoes into the field early. To add to the late start, we've been experiencing relatively low temps this growing season compared to recent years. In the Hudson Valley, it's usually excessive heat that delays ripening in July and August. Dr. Steve Reiners of Cornell University says the ideal temperature for fruit ripening is between 70-75°F. Above 85-90°F the ripening process slows significantly or even stops. At these temperatures, lycopene and carotene, pigments responsible for giving fruit their orange to red appearance, cannot be produced. As a result, the fruit can stay in a mature green phase for quite some time. But ripening also slows down when temperatures approach 60°F, and cool nighttime temperatures can also interfere with pollen formation. I checked weather data to compare GDD from last year to this year as well as hours of adverse ripening temperatures below 65°F or above 85°F. Below is the summary of what I found according to the weather data gathered at the Hudson Valley Lab in Highland. You can compare weather data collected closer to you by going to the NEWA website at <http://newa.cornell.edu/>

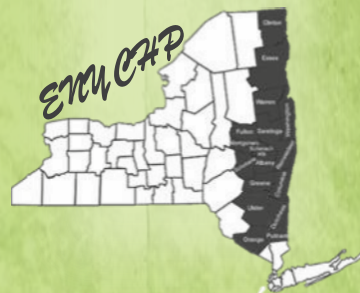
	Growing Degree Days Base 50			Hours Adverse Ripening Temps. (<65F / >85F)		
	June	July	Aug 1-7	June	July	Aug 1-7
2016	554	758	140	218 / 19	55 / 92	22 / 8
2017	540	673	124	265 / 24	155 / 29	47 / 3

So is there anything you can do to hasten ripening? Here are some suggestions from Steve Reiners. "Light conditions have very little to do with ripening. Tomatoes do not require light to ripen and in fact, fruit exposed to direct sunlight will heat to levels that inhibit pigment synthesis. Direct sun can also lead to sunscald of fruit. Do not remove leaves in an effort to ripen fruit. Also, soil fertility doesn't play much of a role. We do know that high levels of magnesium and low levels of potassium can lead to

*continued on next page*

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conditions like blotchy or uneven ripening or yellow shoulder disorder. But the slowness to ripen is not likely due to soil conditions and adding additional fertilizer will do nothing to quicken ripening. If you absolutely cannot wait, some growers will remove fruit that are showing the first color changes. These fruit, in the mature green or later phase, could be stored at room temperature (70-75F) in the dark. A more enclosed environment would be best as ethylene gas, released from fruit as they ripen, will

stimulate other fruit to ripen. If temperatures remain high outdoors, these picked fruit will ripen more quickly, perhaps by as much as five days. As far as flavor, the greener fruit should develop flavor and color similar to what you would get if field ripened. The key is picking them when they are showing the first signs of ripening (no earlier) and keeping them at room temperature. Do not refrigerate, as this will absolutely destroy their flavor."

## Sunburn "Spots"

Maire Ullrich, ENYCHP

There have been many reports of mysterious spots on a variety of vegetable crops. These spots of various shapes and sizes, depending on leaf structure, are light tan/white with no rings or other distinguishing characteristics. They suddenly appear on several leaves of a plant on many of the plants in a field, virtually overnight. This is a version of sunburn. Our cool nights have had a lot more dew on the leaves than is normal for this time of year and then it is followed with a day of high UV readings. The water droplets on the leaf act as a magnifying lens and the sun's rays burn the leaves. This is more common in tender plants, in the spring, that have not been hardened off properly, but can happen anytime. Within a few days the damaged tissue dries and usually falls away leaving holes or ragged leaves. But, if conditions are right, it can be a place where infection can take hold so keep an eye on it!



*Dramatic sunscald/scorch on green bean –  
Photo: Perdue University, John Orick, Madison Co Extension*

## *Recall of Organic Insecticide Azatrol*

Kerry Richards; University of Delaware Pesticide Safety Education Program; [pesticidesafety@udel.edu](mailto:pesticidesafety@udel.edu)

On July 27, 2017 PBI-Gordon Corporation announced a nationwide recall of all Azatrol products, specifically Gordon's Azatrol EC insecticide and Azatrol Hydro Botanical Insecticide. Both of these products can be identified by the EPA Registration Number 2217836. PBI Gordon initiated this national recall in part due to the result of a June 2017 decision by Oregon Department of Agriculture to issue a Stop Sale, Use, or Removal (SSUR) of these products after discovering the presence of five synthetic pesticide active ingredients which were not listed on the labels of these two registered organic pesticide products. While the five conventional active ingredients found in these two products can be used on a variety of ornamental, food, and feed crops safely, because they were not identified on the labels of the Azatrol products this constitutes misbranded and adulterated product. The nondeclared conventional pesticide active ingredients found in the two organic pesticide products are: quantifiable levels of permethrin, bifenthrin, cypermethrin, cyfluthrin, and chlorpyrifos. Malathion was not detected at a quantifiable level. PBI-Gordon is asking distributors to return any unused Azatrol in their inventories, as well as any unused Azatrol returned to distributors by their customers.



## We Weren't Kidding! Tomato Hornworm Damage

Amy Ivy, ENYCHP

Two weeks ago we ran a warning to be on the lookout for tomato hornworms. We have seen them cause considerable damage to high tunnel grown tomatoes, feeding on both the leaves and unripe fruit.

To the right is a photo of a high tunnel pepper, or what's left of the pepper, after a visit by a couple of hornworms. They are pretty easy to spot once the plant becomes this damaged, but it sure would be nice to catch them before it got this bad!

Tomato fruitworm is the same as corn earworm, for which we have traps in sweet corn plots throughout our region. Keep an eye on the trap catches on the last page of the newsletter each week and if the numbers go up, give your tomatoes a close look.



## August Garlic Update

Crystal Stewart—ENYCHP

Most of the garlic which was harvested this year is dry or nearly dry, and is headed for longer term storage. You know that garlic is dry when the innermost leaf is completely dry and will not slip at all against the scape. At this point, if you are drying your garlic somewhere warm like a high tunnel, it's important to move to a location which is a bit cooler (75 degrees F or cooler) and has relative humidity at or below 75% consistently. This change in storage will prevent garlic from overdrying while also preventing the development of diseases like aspergillus or embelissia.

In storage, there are a variety of diseases to look for, including fusarium, surface molds, penicillium, and in a few places white rot. It is important to also check for sun scald and waxy breakdown, two abiotic diseases caused by exposure to sun and heat. Here's a bit about each of the



Fusarium

issues you might see:

**Fusarium** diseases can cause basal rots and bulb rots. Postharvest symptoms include lesions on individual cloves or throughout the bulb. The lesions may have a pink halo, but sometimes this symptom is absent. Symptoms usually start near the basal plate, and may leave the roots and wrapper leaves unaffected.

If selling or using garlic for seed, you want to eliminate bulbs with visible fusarium. Garlic to be sold as food can have a small amount of fusarium on the base, but if the leaves are separating from the base or the base is cracking, the garlic will not store well and should be discarded.

**Botrytis** causes neck rot in garlic, and can cause significant losses in storage. Disease moves down the stem and into the innermost cloves, causing softening and decomposition. Look for grey or white fungal growth in



*Botrytis on the inner wall of a garlic clove. Image: Oregonstate.edu*

the neck and black sclerotia in advanced infections. Any garlic with these symptoms should be discarded as soon as possible.

#### **Emerging issue:**

***Colletotrichum sp.*** For the last couple years we have been seeing symptoms on the garlic scape that we believe are caused by

garlic anthracnose, or *Colletotrichum*. The infected scapes get an orange lesion and then fall over. This year is the first in which we have seen these symptoms travel down the scape to the wrapper leaves. We are watching samples to see if any further disease development occurs—at this point, no clove damage has been detected.

**Scary, but not a problem:** We saw numerous locations with bright red spots on the wrapper leaves at harvest time. So far the red spots have remained confined to the wrapper leaves, often just the first two layers or so. We suspect that there might have



been some microorganisms living against the garlic which stained it red, but which did not affect the bulbs.

**Waxy breakdown:** In cases where the garlic was allowed to get over 120 degrees F, we see waxy breakdown. This is an environmental issue exclusively- no disease is involved. Cloves become soft, yellowish, and sticky. Garlic with waxy breakdown won't store and should be thrown away. Care should always be taken to dry garlic without heating it excessively.



**Sunscald:** We don't see this too often, but if garlic is allowed to lay in the sun too long at harvest time, it will burn on the side facing the sun. This results in a (very difficult to photograph) white, firm, sunken area across the affected cloves. The garlic might hold up in storage, though it will be susceptible to secondary infections.

## Battered Onions

Amy Ivy, ENYCHP

Onions can become pretty battered by mid August from a variety of fungal diseases, insect pressure and/or the pounding from wind, rain or hail. Here's a review of what you might be seeing right now. If your crop is close to Harvest, but has been hit hard by one or more of these problems this year, it might be best to harvest the crop a little early to stop the progression.



#### **Onion downy mildew - *Peronospora destructor* (photo credit A. Ivy)**

The most serious problem in this list is downy mildew of onions (which is not the same species that affects cucurbits, basil or other non-allium crops). It starts as a subtle hazy patch on older onion leaves but quickly spreads through the planting. It is favored by the cool, wet weather we've been having and can really take off once it

Christy Hoepting from the Cornell Vegetable Program has put together this handy chart of fungicides registered for onion leaf diseases in NYS in 2017: [https://rvpadmin.cce.cornell.edu/uploads/doc\\_583.pdf](https://rvpadmin.cce.cornell.edu/uploads/doc_583.pdf)

reaches your farm.

It has not been found in Orange County yet, but all growers should keep an eye out for this disease. This is





*Onion thrips damage (photo credit A. Ivy)*

one where you do want to pull the crop if you're close to harvest anyway and/or don't want to do a lot of spraying. Left unchecked it can quickly move into the neck.

#### **Botrytis leaf blight - *Botrytis squamosa***

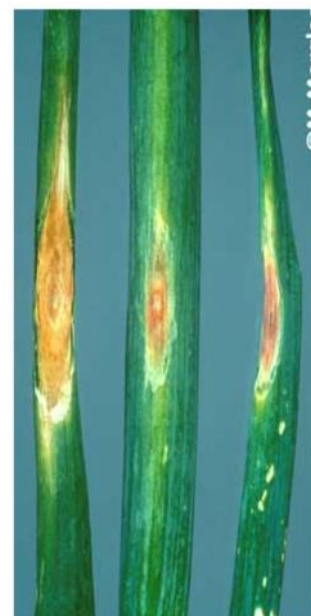
This is a common fungal disease in onions recognized by sunken white spots surrounded early on by greenish white haloes. The photo shows a severe infestation.

#### **Onion thrips damage**

Onion thrips are tiny insects that usually stay down in the center of the plant where the leaves emerge. To scout for them, spread the leaves apart a bit in order to see where they like to hide. You might need a hand lens to find them. They feed on the leaves as they emerge but can sometimes be found along the leaf blade. The heavy, frequent rains have helped reduce their numbers this year



*Botrytis leaf blight - *Botrytis squamosa* (photo credit C. Hoepting)*



*Purple blotch on onions - *Alternaria porri* (photo credit M. Morales)*

somewhat.

The damage they do looks very much like botrytis leaf blight except without the haloes. If you're able to spot the thrips then you'll know. The spray threshold for organic or conventional growers is one thrips per leaf.

**Purple blotch on onions - *Alternaria porri*** Purple blotch often invades tissue already damaged by other factors, but it can kill more leaf tissue than the primary cause would have done. This disease also affects leek foliage with some years being worse than others.

## **Timing Onion Sprout Inhibitor Application & Managing Black Mold**

Ethan Grundberg, ENYCHP

Properly timing the application of Royal MH-30 (*maleic hydrazide*) sprout inhibitor is equal parts art and science. Here are some tips on how to make the most of your inhibitor:

- In general, sprout inhibitor should be sprayed once onions are fully mature (a good rule of thumb is that about 50% of onion tops should be down) on storage varieties that will be kept past November.
- Spraying inhibitor before bulbs are fully mature can result in loose and spongy bulbs that are unmarketable and more prone to mold and rot in storage.
- However, waiting too long is equally problematic. Onions should still have 5-8 green leaves per bulb in order to provide enough living tissue for the inhibitor to be absorbed and translocated to the bulb. If fewer than 5 leaves remain green or if plants have severe foliar disease pressure, there is a serious risk that the maleic hydrazide will not be taken up by the plant.
- Sprout inhibitor is not a silver bullet for guaranteeing good storage, either. If MH-30 is sprayed more than two weeks in advance of harvest and the bulbs are exposed to temperature extremes and rain in the field, bulbs may be triggered to break dormancy regardless of inhibitor application and uptake.
- Care must be taken to avoid applying inhibitors at temperatures above 85 degrees. Given the weather forecast for the next several weeks, it does not appear that high temperatures should be a concern,

but check the forecast before making the decision to apply!

- Sprout inhibitor will not magically make a sweet onion store as well as a storage variety. Applications should only be made to varieties that are bred for long-term storage.

One final consideration on sprout inhibitor application timing: studies have repeatedly demonstrated that bulb onions size up significantly in the last month prior to 100% falling over. One study by Davis and Jones showed that yields per acre increased by 10,500 pounds/acre in the time from 10% tops down to 100% tops down. However, other studies have shown that, in order to achieve maximum storage life, harvest should be timed around 40% lodge. So, depending upon your goals (maximum yield or maximum storage life) the timing of your inhibitor application and harvest may vary slightly.

Another question that often arises when discussing inhibitor application is whether to tank mix it with any adjuvants or fungicides. To answer the first question on adjuvants, the Royal MH-30 clearly states NOT to mix inhibitor with any adjuvants for onions grown east of the Rocky Mountains. The arid conditions of western grown onions at harvest often accelerates leaf dry down and requires the addition of a non-ionic surfactant to be added to facilitate absorption and translocation by the onions. However, the issue of whether to apply with a fungicide is more complicated. MH-30 is compatible with most fungicides, but it is recommended NOT to tank mix them. Growers also need to consider the mode of action of the fungicide being sprayed; inhibitor is formulated to penetrate the cuticle and move around the plant, so fungicides like copper and chlorothalonil that are effective on the leaf surface as protectants don't make sense to use with MH-30. Growers also need to assess the percentage of leaves that are still green, too. If leaves are mostly dry, they will not benefit from another foliar fungicide application.

What about late season fungicide applications for black mold (*Aspergillus niger*)? Multiple field experiments conducted both by Cornell and University of Georgia faculty have shown that **there is no statistically significant improvement in black mold reduction from late season fungicide applications once leaves have dried**. The same studies have, however, concluded that in-season foliar fungicide programs that are targeted to manage other foliar diseases (botrytis, stemphylium, and purple blotch) **DO** reduce the incidence of black mold in storage. Those interested in more detail on these trials should refer to the

research done by Hunt Sanders et al in 2013-14 starting on page 37 at [https://secure.caes.uga.edu/extension/publications/files/pdf/AP%20114\\_1.PDF](https://secure.caes.uga.edu/extension/publications/files/pdf/AP%20114_1.PDF).



*Onions about 15% down and still not ready for inhibitor*



*Onions about 60% down, but still with adequate green foliage for a well-timed inhibitor application*



So if late season fungicide applications don't reduce the presence of black mold on onions, what will?

- As already mentioned, keeping up with an effective foliar fungicide spray program in season
- Ensuring the onions are fully mature and dry at harvest, which can be facilitated by deeper under-cutting early in the harvest process or lifting later in the season once sunburn is less of a concern
- Minimizing bruising and physical injury to onions

during the harvest process

- Most importantly, focusing on creating the ideal post-harvest curing and storage conditions! Ideal curing conditions are 75°F-80°F at 70% humidity for about 2 weeks. Once curing is complete, both temperature and humidity should be gradually lowered to near 33°F and 50%, respectively. Since black mold thrives at temperatures above 60°F and at relative humidity of 80% and higher, hot and humid storage and curing conditions create a prime environment for it to grow.

## Turbulence in the Grocery Aisles

William Drake, Cornell University

In an unexpected, blockbuster announcement on June 16, Amazon Inc., the nation's largest online retailer declared its intention to acquire Whole Foods Market Inc. in a friendly deal valued at \$13.7 billion. Rapidly growing Amazon, which in 2016 accounted for 43% of all online sales in the U.S., has made significant inroads in the retailing of books, music, electronics, clothing, baby goods and shoes but has to date been less successful in penetrating the \$800 billion U.S. grocery segment. One of Amazon's core values is frugality and it has a proven history of driving down prices in the categories in which it competes in a big way. One of Amazon CEO's favorite aphorisms is "your margin is my opportunity." Food, simply because of razor thin margins and perishability, is an inherently difficult business for an online/home delivery model. Amazon began testing its full line (dry grocery and full perishables) Amazon Fresh concept in 2007 and has to date rolled it out in only a handful of large urban markets. Online grocery players like Ahold Delhaize-owned Peapod, Fresh Direct and Instacart have as yet not proven to be profitable on a freestanding basis.

The hugely successful Amazon Prime subscription program, which provides free delivery and a growing array of other benefits, is likely to play a central role in future strategy. Prime's penetration of affluent households, combined with the fact that 62% of Whole Food's shopper are Prime members, opens endless marketing possibilities, including discounts offered to Prime members shopping at Whole Foods. It is likely that Whole Food's price image will improve. Amazon's "subscribe and save" automated replenishment model, in which customers receive discounts in return for brand loyalty, could be extended to retail.

Perhaps the most impactful result of the acquisition concerns the "last mile" complexity of perishables home delivery. Whole Foods gives Amazon a network of 460+ locations in attractive, densely populated urban markets which can be deployed as "mini-warehouses" for home delivery. Stores could also serve as pick-up points for a click and collect model, which is growing in popularity. These types of activities are likely to accelerate the penetration of online food retailing and in turn, further pressure the top line of traditional grocers. Amazon's acquisition of Whole Foods has traditional food retailers scrambling to build scale, cut costs, and boost online capabilities as they prepare for a more price competitive, omni-channel future. Price and cost pressure on food industry suppliers will intensify in kind. Certain suppliers may benefit if Amazon chooses to selectively strengthen alliances with select suppliers as part of their subscription model of consumer replenishment.

One thing is certain – the Amazon/Whole Foods combination is a transformative event that will forever alter the landscape of the food industry.



## Sweet Corn Pheromone Trapping Network 7/31 - 8/8

County	Corn Earworm	European Corn Borer-Z (Iowa)	European Corn Borer-E (NY)	Fall Armyworm	Western Bean Cutworm
Orange	9	2	0	11	6
C. Ulster	2	8	76	0	0
S. Ulster	1	0	1	Na	Na
N. Dutchess	0	0	1	0	0
Columbia	3	0	0	0	68
Greene	Na	Na	Na	Na	Na
Albany	1	0	0	1	17
Schoharie	0	0	0	3	7
Fulton	0	0	3	0	0
Saratoga	1	0	0	7	12
S. Washington	0	0	0	3	12
N. Rensselaer	0	2	2	4	24
S. Clinton	0	0	0	0	128
C. Clinton	0	0	3	0	81

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## UPCOMING ENYCHP EVENTS

### ***Berry Crops Field Workshop Tuesday, August 29th, 2017***

*5:00 – 7:00pm at The Berry Patch  
15589 NY-22, Stephentown, NY 12168*

#### **This workshop will cover the following topics:**

- Plasticulture strawberry production for June berries and Day Neutral
- Low tunnels on strawberries
- High tunnel raspberry production
- Exclusion netting to control SWD in blueberries
- Using computer models to improve pest management of berry crops
- Collaboration between NEWA and NYS Mesonet

**There will be plenty of time for questions and discussion**

**Please register by calling Abby at 518-746-2553 or registering the ENYCHP website, <http://enych.cce.cornell.edu/> – there is no fee, but it will help us provide the appropriate number of handouts etc. **This event will happen rain or shine.****

*If you have questions, please contact Laura McDermott: 518-791-5038 or [lgm4@cornell.edu](mailto:lgm4@cornell.edu).*

