Cornell University ~ Cooperative Extension
Eastern NY Commercial Horticulture Program

Weekly Vegetable Update

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Regional Updates

North Country – Clinton, Essex, northern Warren and Washington Counties:

Late August has brought some turbulent weather to the northern region. Strong hail hit the Ticonderoga area on August 15, wiping out field tomatoes and peppers. Scattered thunderstorms have produced some sporadic, sometimes heavy, downpours in one town, while the next town over has none. Overall most areas of the northern region have had plenty of rain lately, with warm, sunny conditions in between. This is creating ideal conditions for the last push to ripen melons, winter squash, tomatoes and more. Most early summer squash and cucumbers have succumbed to powdery mildew and other stresses by now. The summer season is wrapping up nicely overall!

Capital District – Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, southern Warren and Washington Counties:

This time of year things seem to chug along, and we hope the weather holds out and we have a peaceful, productive fall. Powdery mildew control is a priority for pumpkin and winter squash growers during this stretch of very favorable weather in order to maintain stems. Flea beetle control on fall brassicas is also a priority in some areas where young transplants are at high risk. Finally, European corn borer catches are spiking in some areas, warranting a tighter spray schedule (see article in the body of the newsletter for more information).

Once you have stopped picking and protecting a crop, remember to take the time to incorporate it rather than just walking away. Old crops can harbor insect pests and are a tremendous source of inoculum for later plantings. This is a great time to disc abandoned crops in and to apply a variety of different cover crops.

Mid-Hudson Valley- Columbia, Dutchess, Greene, Orange, Putnam, and Ulster Counties:

Most of the region received between a half an inch and an inch of rain that came in one short burst last week, although fields remain relatively dry. A lack of precipitation usually means a reduction in fungal diseases, and this has largely been the case with many crops in our area. This is not the case, however, with powdery mildew. Powdery mildew prefers high relative humidity, but not too high; rain and relative humidity above 95% will actually discourage fungal growth. Conditions in the Hudson Valley have been ripe for powdery mildew and we are starting to see it show up in the field. It has recently been identified on tomato, summer squash, and various weed hosts and is likely in a field near you. See "Cornell Recommends" or consult with your local educator for specific crop recommendations. In other news, corn earworm, fall army worm, and western bean cutworm trap counts all increased significantly in Orange County over the past week and are above thresholds for a 4-day spray schedule.

Powdery mildew on tomato. - KB

Serving the educational and research needs of the commercial small fruit, vegetable and tree fruit industries in Albany, Clinton, Columbia, Dutchess, Essex, Fulton, Greene, Montgomery, Orange, Putnam, Rensselaer, Saratoga, Schoharie, Schenectady, Ulster, Warren and Washington Counties

Identifying Potato Tuber Diseases

Potato harvest is underway for fresh eating, direct-market sales and for some early processing varieties. There are many diseases that affect potato tubers so as you begin to sort through your potato harvest this year, take a moment to check for disease symptoms. Proper identification will help you decide which tubers will store well and which should be sold as tablestock, and will give you a better idea of which soil-borne diseases are present in your fields, improving future rotations.

Common Scab (*Streptomyces* spp.) produces tan to dark brown, circular or irregular lesions which are rough in texture. Scab may be superficial (russet scab), slightly raised (erumpent scab), or sunken (pitted scab). The type of lesion is dependent on potato cultivar, tuber maturity at infection, organic matter content of soil, strain of the pathogen, and the environment. Common scab is controlled or greatly suppressed at soil pH levels of 5.2 or lower, though a closely related *Streptomyces* sp. known as acid scab can survive down to 4.0.

Early Blight Tuber, S Jensen

Common Scab, RW Samson

Black Dot (*Colletotrichum coccodes*) On potato foliage symptoms are nearly indistinguishable from early blight and on tubers it produces tiny black sclerotia (fungal resting structures). Symptoms on tubers can be easily mistaken for silver scurf.

Silver Scurf (*Helminthosporium solani*) affects only tuber periderm (skin). Lesions are initiated at the stolon end as small pale brown spots which may be difficult to detect at harvest but will continue to develop in storage. In storage, lesions may darken and the skin may slough off and many small circular lesions may coalesce to form large affected areas. Tubers may also become dried out and wrinkled due to excessive moisture loss in storage.

Early blight (*Alternaria solani*) usually affects potato foliage but tuber infections can also occur. Tuber lesions are dark, sunken, and circular often bordered by purple to gray raised tissue. The underlying flesh is dry, leathery, and brown. Lesions can increase in size during storage and tubers become shriveled.

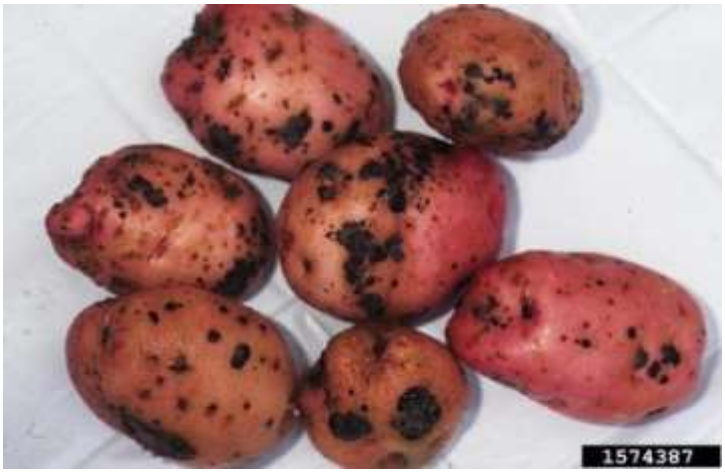
Fusarium Dry Rot (*Fusarium* spp.) causes internal light to dark brown or black dry rot of the potato tuber. The rot may develop at an injury site such as a bruise or cut. The pathogen penetrates the tuber, often rotting out the center. Extensive rotting causes the tissue to shrink and collapse, usually leaving a dark sunken area on the outside of the tuber and internal cavities.

Dry Rot, C Averre

Continued on next page

Identifying Potato Tuber Diseases, continued from last page

Black Scurf and Rhizoctonia Canker (*Rhizoctonia solani*) Black scurf is purely cosmetic and does not reduce yield, even in storage. Irregular, black hard masses on the tuber surface are overwintering structures (sclerotia) of the fungus. Presence of these sclerotia may be minimized by harvesting tubers soon after vine-kill and skin set. While the sclerotia themselves do not cause damage, they allow the pathogen to survive in the soil and serve as evidence of its presence. In cool, wet soils, *R. solani* can cause dark, sunken lesions on underground sprouts and stolons. These lesions can cut off the supply of nutrients, killing tubers, or can reduce the transfer of starches to the tubers, reducing their size. Cankers can also form on the tubers themselves, usually at the stolon or in lenticels. Cankers on tubers which can be small and superficial but may be large, sunken and necrotic.



Rhizoctonia solani forming black scurf above (Photo G. Holmes) and forming cankers below (Photo Clemson Univ.)

Pink Rot (*Phytophthora erythroseptica*) and Pythium Leak (*Pythium* spp.) Pink rot infections start at the stolon end and result in rotten and discolored periderm with a clear delineation between healthy and diseased tissue. When exposed to air, tuber flesh turns pink and then brown-black. *Pythium* spp. that cause leak infections invade tubers through harvest wounds and continue to develop in transit and storage. Infections result in internal watery, gray or brown rot with well-defined red-brown lines delineating healthy and diseased tissue.

Pink Rot causes rubbery, distorted lesions. Photo:UMN

Late Blight (*Phytophthora infestans*) affects potato foliage and tubers. Foliar symptoms start with brown to black, water soaked lesions on leaves and stems which produce visible white sporulation at the lesion margins under humid conditions. Whole plants and fields may collapse rapidly. Tuber infection is initiated by sporangia from foliage being washed down into the soil and usually begins in wounds, eyes, or lenticels. Lesions are copper brown, red or purplish and white sporulation may occur on tuber surfaces in storage or cull piles. Infected tubers are susceptible to infection by soft rot bacteria which can turn entire bins of potatoes in storage into a smelly, rotten mass.

Black Heart is physiological disorder caused by lack of oxygen during storage which causes the tissue to die from the inside out and turn black. The condition is not reversible but if you notice it quickly and correct your storage conditions you can prevent the whole crop from being affected.

Potato Virus Y can cause necrotic ring spots on tubers, depending on which strain of the virus is present, which potato variety is grown, and the time of infection. Affected tubers have roughened rings of darker brown or reddened skin. Necrosis beneath the rings may extend into the tuber flesh. Necrotic symptoms in tubers often increase after storage. Potato varieties vary in their susceptibility to PVY and the symptoms they exhibit on foliage and on tubers; Yukon Gold is particularly susceptible to tuber necrosis. If you think you are seeing symptoms of PVY

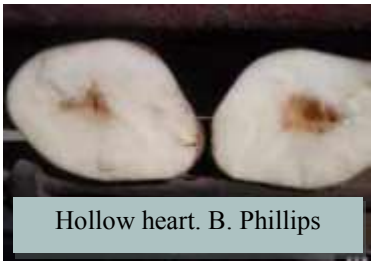
Continued on next page

Identifying Potato Tuber Diseases, continued from last page

on foliage or tubers, please contact Chuck Bornt at cdb13@cornell.edu.

Potatoes with Potato virus Y
Image: USDA APHIS

Brown Center and Hollow Heart are internal physiological disorders of potato which often occur together. Brown center is an area of dead pith cells which turn brown, while hollow heart is a star or lens shaped hollow area in the center of the tuber. These disorders make cut fresh-market tubers unattractive and can reduce repeat sales. Severe hollow heart negatively impacts the quality of chip-processing potatoes and can result in shipments not making grade. Both disorders are related to stress, and occur at a higher incidence when growing conditions abruptly change during the season. Brown center and hollow heart effects likely form during tuber initiation but could also form during tuber bulking. If the disorder occurs during the early part of the season, then it is most often preceded by brown center and forms in the stem-end of the tuber, while late-forming hollow heart usually occurs near the bud-end with no brown center symptoms occurring. Conditions such as when soil temperatures are less than 56°F for 5–8 straight days, or when available soil moisture is greater than 80% cause brown center to start forming. Incidence of brown center and hollow heart also increases with periods of stress because of high or low moisture levels, especially if heavy water applications follow a period of stress because of low moisture levels. Large tubers are more prone to develop the disorder, so using closer spacing and making sure not to have too many skips in the row can reduce incidence of brown center and hollow heart. There are also differences in the susceptibility of potato varieties; 'Atlantic', a widely grown potato for chip processing, is relatively susceptible to both disorders. In 'Russet Burbank', susceptibility to both brown center and hollow heart is highest soon after tuber initiation when the tubers are small.



Hollow heart. B. Phillips

Written by S.B. Scheufele, UMass. Originally printed in the August 20th edition of UMass Vegnotes.

Nutrient Considerations for Brassicas

Apart from recommended NPK fertility programs, growers of cabbage, broccoli, cauliflower, Brussels sprouts, kale, and collards need to pay attention to sulfur, calcium, and boron in their cole crop fertility programs.

In vegetable crops, sulfur removal is generally in the 10-20 lb/A range. Mustard family crops (cole crops such as cabbage and broccoli, mustard and turnip greens, radishes) remove between 30 and 40 lbs/A of sulfur. Most of the sulfur in the upper part of the soil is held in organic matter. Upon mineralization, sulfur is found in the soil as the sulfate ion ($SO_4^=$) which has two negative charges. The sulfate ion is subject to leaching, especially in sandy textured soils (loamy sands, sandy loams). It does accumulate in the subsoil but may not be available for shallow rooted vegetables.

Sulfur can be added by using sulfate containing fertilizers such as ammonium sulfate, potassium sulfate, and K-mag (sulfate of potassium and magnesium). It is also a component of gypsum (calcium sulfate). In liquid solutions, ammonium thiosulfate is often used as the sulfur source. Sulfur is also found in manures and composts. For example, broiler litter has about 12-15 lbs of sulfur per ton.

Calcium deficiency is most commonly seen as tipburn of cauliflower, cabbage, and Brussels sprouts. This problem can cause severe economic losses. Tipburn is a breakdown of plant tissue inside the head of cabbage, individual sprouts in Brussels sprouts, and on the inner wrapper leaves of cauliflower. It is a physiological disorder which is associated with an inadequate supply of calcium in the affected leaves, causing a collapse of the tissue and death of the cells. Calcium deficiency may occur where the soil calcium is low or where there is an imbalance of nutrients in the soil along with certain weather and soil nutrient conditions, such as high humidity, low soil moisture, high potash or high nitrogen all of

which can reduce calcium availability. (*Ed: this phenomenon is further explained by Dr. Thomas Björkman on the Veg Md website: "The disorder can be caused by a lack of Ca in the soil, but usually tipburn results from the plant's inability to move sufficient Ca to the young, actively growing, inner head leaves at a critical point in their development. In a normal daily cycle, Ca moves with the transpiration stream to the outside leafy parts of the plant that are actively transpiring on sunny days. At night, especially when dew forms, transpiration by the leaves is reduced, and water movement generated by the roots (root pressure flow) is directed to the inner part of the head. On warm, dry nights the outer leaves continue to transpire, however, and the Ca is diverted away from the head. Once Ca is fixed by the outer leaves, it cannot be translocated to the interior of the head. Other stress factors besides prolonged nocturnal transpiration may also induce tipburn. Drought, water logging of the soil, root pruning, and similar stresses on the root system impair the plant's ability to absorb and translocate Ca to the young leaves within the head. An adequate supply of Ca in the soil will not prevent tipburn, nor has spraying with Ca been effective.*

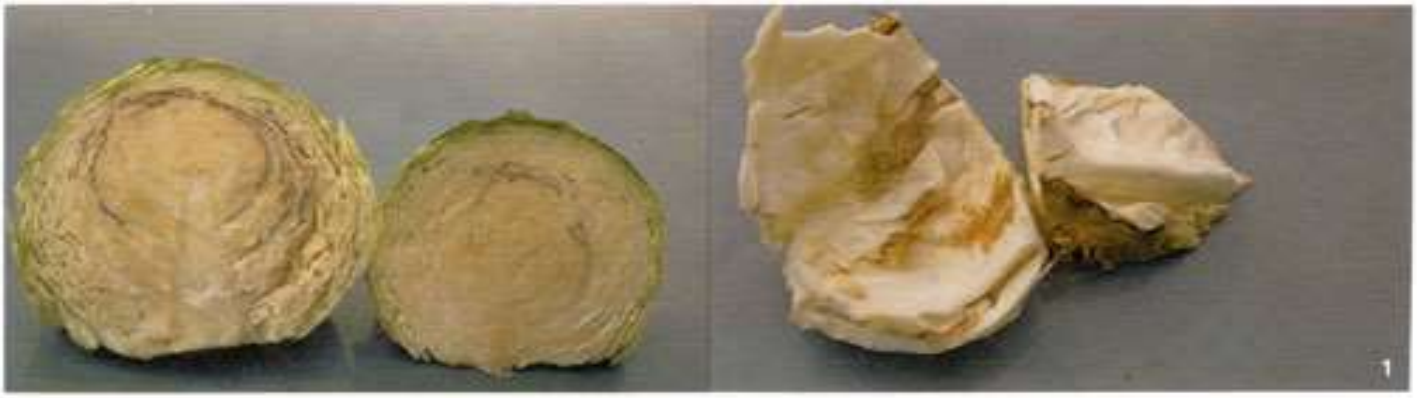
Tipburn initiation is influenced by plant growth rate because the plant has a high demand for Ca during periods of rapid growth. High fertility, especially nitrogen, promotes rapid growth and, consequently, tipburn development. Well-drained soils with good structure encourage root growth and water and nutrient uptake. The maintenance of uniform soil moisture by supplementary irrigation during times of moisture stress may be beneficial.")

Secondary rot caused by bacteria can follow tipburn and heads of cauliflower can be severely affected. Some cabbage and cauliflower cultivars are relatively free of tipburn problems. Cabbage varieties with good resistance to tipburn include Artost, Blue Vantage, Bobcat, Cecile, Emblem, Green Cup, Megaton, Padok, Platinum Dynasty, Quick Start, Royal Vantage, Solid Blue 780, Superstar, Thunderhead, and Vantage Point. Check with your seed supplier for tipburn ratings for other varieties. Controlling tipburn starts with managing liming so that soil pH is above 6.0. Avoid using only ammonium forms of nitrogen, and ensure an adequate and even supply of water. Adjust planting date so that head maturation occurs during cooler temperatures. Plant a cultivar that is less susceptible to the disorder. In general, calcium foliar sprays have not been shown to be effective for controlling tipburn incidence.

Cole crops have a high boron requirement. Symptoms of boron deficiency vary with the cole crop. Cabbage heads may simply be small and yellow. Most cole crops develop cracked and corky stems, petioles and midribs. The stems of broccoli, cabbage and cauliflower can be hollow and are sometimes discolored. Cauliflower curds become brown and leaves may roll and curl. It is important to note that cole crops are also sensitive to boron toxicity if boron is overapplied. Toxicity symptoms appear as scorching on the margins of older leaves.

It is recommended in broccoli and kale to apply 1.5-3 pounds of boron (B) per acre in mixed fertilizer prior to planting. In Brussels sprouts, cabbage, collards and cauliflower, boron and molybdenum are recommended. Apply 1.5-3 pounds of boron (B) per acre and 0.2 pound molybdenum (Mo) applied as 0.5 pound sodium molybdate per acre with broadcast fertilizer. Boron may also be applied as a foliar treatment to cole crops if soil applications were not made. The recommended rate is 0.2-0.3 lb/acre of actual boron (1.0 to 1.5 lbs of Solubor 20.5%) in sufficient water (30 or more gallons) for coverage. Apply foliar boron prior to heading of cole crops.

-by Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu. Originally published in University of Delaware Cooperative Extension Weekly Crop Update, 8/14/15



Images: tipburn in cabbage. VegMD

Calendar of Events

Tile Drainage Field Day

Tile Plow & Backhoe installed
Tuesday, September 1st, 1-4pm
Field of Aaron Gabriel, 119 Waite Rd., Easton, Washington Co.
Follow signs at dirt lane under power lines:
1.4 mi from State Rte 40 & ~0.5 mi from Co. Rte 113
See a tile plow in action (run by Allenwaite Farm) & learn the nuts & bolts of installation.
Backhoe demonstration of tile installation
Learn the technical aspects of laying out drainage, system sizing, outlet installation, installing pipe, backfilling, etc.
Certified Crop Advisor Credits requested

Please RSVP to Tove Ford, 518-765-3518, tff24@cornell.edu
or Aaron Gabriel, 518-380-1496, adg12@cornell.edu

Mark your calendars: Allium Schools: Garlic, Onions, and other Alliums

Sept. 14, Holiday Inn, Saratoga Springs, NY 6pm-8pm
Sept. 15, Double Tree by Hilton, Burlington, VT, 6pm -8pm
Free, buffet dinner to be provided. Join regional specialists Amy Ivy, Christy Hoepting, and Crystal Stewart along with Dr. Masanori Seto and University of Vermont researchers for a discussion of all things Allium! More information to follow.

Root Crop Twilight Meeting

September 29th 4-6 pm,
Hudson Valley Farm Hub
Join Regional Specialist Crystal Stewart, pathologist Dr. Sarah Pethybridge, and Jan VanDerheide of Bejo Seeds as we tour and evaluate 18 varieties of beets, over 25 varieties of carrots, and 7 varieties of parsnips for yield and quality.

Sweet Corn Pest Trap Catches

(Last Week ending 8/17 This Week ending 8/24/15)

Location	ECB-E Last Week	ECB-E This Week	ECB-Z Last Week	ECB-Z This Week	CEW Last Week	CEW This Week	FAW Last Week	FAW This Week	WBC Last Week	WBC This Week
Central Clinton	N/A	0	N/A	0	N/A	0	N/A	0	N/A	23
South Clinton	0	0	0	0	0	0	0	9	23	2
Orange County	0		0		0		0		0	
Central Ulster										
Northern Ulster										
Northern Washington	19	1	2	16	1	14	0	0	2	1
Southern Washington	4	1	2	0	0	3	N/A	0	N/A	0
Albany County	2	1	0	1	0	5	0	2	9	0
Fulton County	0	1	0	0	0	0	N/A	0	N/A	0
Schoharie County	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
Northern Columbia	1		1		0		20		3	

Sweet Corn

This week finally saw the arrival of the first real significant flight of Corn Earworms and some continued Fall Armyworm flights. For those of you growing the Bt varieties, it has been my experience that they are not 100% effective for FAW or CEW. This especially holds true when the following conditions are met: high adult moth trap catches and high temperatures. I think that it might be the high temperatures that might be more of the issue as the Bt proteins located in the silks of the ear, dry down much faster allowing for less time for the larvae to ingest the green silks. And when I say less effective what I mean is that there is still some effect in that larvae are often smaller and don't do as much damage, but they are still there and can still render the ear unmarketable. What to do? Continue to follow the trap catches that we post in this newsletter and consider applying a spray based on the table below. Remember that corn at the silking stage is the most appealing to CEW. Also remember that pyrethroids are less effective when temperatures are in the mid to upper 80's so consider using other materials like Lannate, Coragen or the spinosids (Radiant etc.). -CB

Average Corn Earworm Pheromone Catch			
Per Day	**Per Five Days**	**Per Week**	**Days Between Sprays**
<0.2	<1.0	<1.4	No Spray (for CEW)
0.2-0.5	1.0-2.5	1.4-3.5	6 days
0.5-1.0	2.5-5.0	3.5-7.0	5 days
1-13	5-65	7-91	4 days
over 13	over 65	over 91	3 days

Corn earworm adult moth.
Photo courtesy www.cirrusimage.com

Corn earworm eggs.
Photo courtesy www.wikimedia.org

Corn earworm larva.
Courtesy Oklahoma State-U Entomology & Plant Pathology

Corn earworm feeding and damage on tomato (left and center) and pepper fruits (right).
Photos courtesy of University of Delaware Cooperative Extension (left), and Missouri Botanical Garden (center and right)

2015 Weather Table—The weather information contained in this chart is compiled using the data collected by Network for Environment and Weather Applications (NEWA) weather stations and is available for free for all to use. For more information about NEWA and a list of sites, please visit http://newa.cornell.edu/ This site has information not only on weather, but insect and disease forecasting tools that are free to use.

2015 Weekly and Seasonal Weather Information

	Growing Degree Information Base 50^{O} F			Rainfall Accumulations		
Site	**2015 Weekly Total** 8/17- 8/24	**2015 Season Total** 3/1 - 8/24	**2014 Season Total** 3/1 - 8/24	**2015 Weekly Rainfall** (inches) 8/17 - 8/24	**2015 Total Rainfall** (inches) 3/1 - 8/24	**2014 Total Rainfall** (inches) 3/1-8/24
Albany	**183.1**	**2358.3**	**2112.0**	**0.86**	**17.06**	**19.53**
Castleton	**173.7**	**2862.9**	**1994.0**	**0.79**	**18.24**	**19.59**
Clifton Park	**179.2**	**2264.4**	**1911.8**	**0.81**	**15.23**	**20.56**
Fishkill	**169.0**	**2247.0**	**Na[1]**	**0.81**	**6.08**	**Na[1]**
Glens Falls	**167.0**	**2030.1**	**1889.0**	**0.34**	**14.87**	**23.47**
Griffiss	**147.5**	**1890.7**	**1777.0**	**0.98**	**22.12**	**26.61**
Guilderland	**80.0[2]**	**2036.5[2]**	**1930.0**	**0.05**	**15.58**	**Na[2]**
Highland	**171.3**	**2364.5**	**2121.5**	**1.07**	**17.13**	**22.43**
Hudson	**176.3**	**2355.2**	**2126.7**	**1.01**	**16.05**	**25.61**
Marlboro	**168.0**	**2273.8**	**2040.0**	**1.11**	**14.76**	**21.44**
Montgomery	**166.6**	**2317.4**	**2078.0**	**1.06**	**17.2**	**18.66**
Monticello	**135.9**	**1817.5**	**1630.5**	**0.86**	**13.91**	**8.45**
Peru	**166.1**	**1922.4**	**1805.5**	**0.4**	**17.28**	**20.74**
Red Hook	**172.2**	**2247.4**	**2076.4**	**1.15**	**17.55**	**11.82[3]**
Wilsboro	**164.8**	**1877.9**	**1742.0**	**0.24**	**21.3**	**11.06**
South Hero, VT	**176.7**	**2007.5**	**1887.6**	**0.55**	**19.9**	**21.5**
N. Adams, MA	**150.2**	**1838.3**	**1686.5**	**0.59**	**18.12**	**20.31**
Danbury, CT	**170.5**	**2157.6**	**1926.0**	**0.24**	**18.0**	**21.23**

Na[1]: The Fishkill site is new for 2015 so there is no historical data to report.
Na[2]: The Guilderland weather station was not properly reporting precipitation data in 2014 so no data will be shown for this site.
*: Precipitation data for this site did not began until May of 2014.