Cornell University Cooperative Extension

Eastern NY Commercial Horticulture Program

Vol. 1, Issue 3
April 18, 2013

Weekly Vegetable Update

CONTACT INFORMATION

Chuck Bornt
61 State Street
Troy, NY 12180
Office: 518-272-4210
Cell: 518-859-6213
cdb13@cornell.edu

Amy Ivy
6064 Rte 22 Suite 5
Plattsburgh, NY 12901
Office: 518-561-7450
Cell: 518-570-5991
adi2@cornell.edu

Teresa Rusinek
232 Plaza Road
Kingston, NY 12401
Office: 845-340-3990
tr28@cornell.edu

Crystal Stewart
141 Fonclair Terrace
Johnstown, NY 12095
Cell: 518-775-0018
cls263@cornell.edu

Maire Ullrich
18 Seward Ave. Ste. 300
Middletown, NY 10940
Office: 845-344-1234
mru2@cornell.edu

Newsletter Layout: Carrie Anne Doyle

Content Editor: Crystal Stewart

Regional Updates:

North Country—Clinton, Essex, northern Warren and Washington counties

Spring stayed away until early this week when temperatures finally got above 50 by day with a little sunshine and stayed above freezing overnight. Transplant production is coming along where some heat could be applied but growth has been slow due to cloudy weather. Lots of field work is going on to prepare soil and the earliest direct seedings of cool season crops are underway. In tunnels, winter greens crops are finishing up and early spring greens are at their prime.

Capital District—Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, southern Warren and Washington counties

A little bit of sun is going to do us a world of good. So far growth has been pretty slow in greenhouses. Growers who have scaled back on watering accordingly are not running into too many problems, however. A couple of sunny days are going to cause large flushes of growth. Remember to scout the tunnels and greenhouses on a warm, sunny day when insects are likely to be most active. Thrips, aphids, and whiteflies may all be present now. Wet weather has slowed or stopped most field work this week.

Mid-Hudson Valley—Columbia, Dutchess, Greene, Orange, Sullivan and Ulster counties

Few situations have changed in the past week. Rain last week was welcomed as field conditions were getting dry. Planting of many (mostly cold-weather crops) continues. Growers have a few acres of bare ground sweet corn in now. Sweet corn under plastic has yet to emerge. Low temperatures and several overcast days have growth slowed.

Coming Events

- Early potatoes will be going in as soon as the ground is dry enough (see article on cutting seed, page 4).
- The earliest peas are just about ready to pick
- Warmer temperatures are forecast for the coming week!

Cold Temperatures are Affecting Tomatoes

Hoop house/high tunnel tomatoes are showing signs of cold stress in a couple of different ways. Leaf purpling can be due to the cold night temperatures we have been experiencing. Other signs, including minor nutrient deficiency symptoms, can be due to low soil temperatures, especially in organic or semi-organic situations. Low soil temperatures lead to low soil flora activity thereby low availability of vital nutrients. In semi-organic (not currently adding conventional soluble fertilizers) situations you can manage this by watering in some fertilizers that supply macro and micro nutrients. In organic situations, some compounds are available for some minerals but Nitrogen is only available in forms that also require a break-down process to be available.

In addition, be cautious with watering times and quantities. Overcast days have led to low transpiration rates and water-logging soil is a risk that can lead to disease and additional problems. *-MRU*

Use Caution When Supplementing Greenhouse and High Tunnel Heat with Unvented Heaters

We mentioned seeing issues in greenhouses with ethylene damage last week, and have received questions asking for more detail on this problem.

This time of year we often see growers protecting tender plants on particularly cold nights using unvented space heaters. Most of the time this works out pretty well, but occasionally the gasses that are released during combustion can damage the plants. Additionally, combustion creates a great deal of water, which can increase the relative humidity levels in your structure and promote diseases.

Generally, a well maintained natural gas or propane heater will completely burn gas to generate carbon dioxide and monoxide, water, nitrogen dioxide, and various volatile organic compounds (VOC's). This mixture of gasses is generally not harmful to plants. Kerosene contains more impurities than propane or natural gas, and therefore may generate more substances harmful to plants during combustion. For this reason, I would use kerosene heat as a last option of the three.

Any of these gasses when not burned clean will generate more substances that are harmful to plants. There are two main reasons that this would happen. If a greenhouse is sealed up very tight, the heater will actually burn up the oxygen in the room and replace it with CO_2. As the oxygen level drops, combustion becomes less and less efficient. The solution to this problem is to crack the door. You will let in cold air, but you will also replenish the oxygen in the room so your heater works correctly.

The second reason that your heater may not function correctly is that it needs to be serviced. Make sure valves are tight, filters are clean, etc. Check the heater regularly for issues.

Plants exposed to ethylene tend to have leaves curl downwards. *Courtesy of Ohio State.*

The two most common plant-damaging substances that come from combustion are ethylene gas and sulfur dioxide. Ethylene can cause leaves to twist or curl downward, and can cause buds to drop from the plant. Sulfur dioxide enters the leaves and is converted to sulfuric acid, which causes leaf flecking and burning on the leaves.

If you have tomatoes in the greenhouse, they will be among the first plants to show any sign of damage. Look for leaves to curl downward as a first symptom. If you suspect you are having issues, feel free to give us a call and we can come and look at your greenhouse set up. *-CLS*

Managing pH and Alkalinity in Greenhouse Transplant and Container Production

The pH of media effects plant vigor, growth, health and ultimately profitability. Managing pH in container media can be a frustrating task, particularly when you are dealing with vegetable transplants in small volumes of media. Management begins with an understanding of the relationship of media components, water alkalinity and fertilizer to pH. Followed up with monitoring and adjustments, pH can be successfully managed.

pH is a measure of how acidic or basic a solution is. Positive charged molecules such as H^+ (hydrogen) will make solutions acidic (lower pH) and the negatively charged OH^- (hydroxide) molecules tend to be basic (raise pH). pH is an important part of managing a plant nutrient program because nutrients are generally available for plant roots to absorb at pH levels of 5.5 to 6.5 (for most plants).

High pH issues

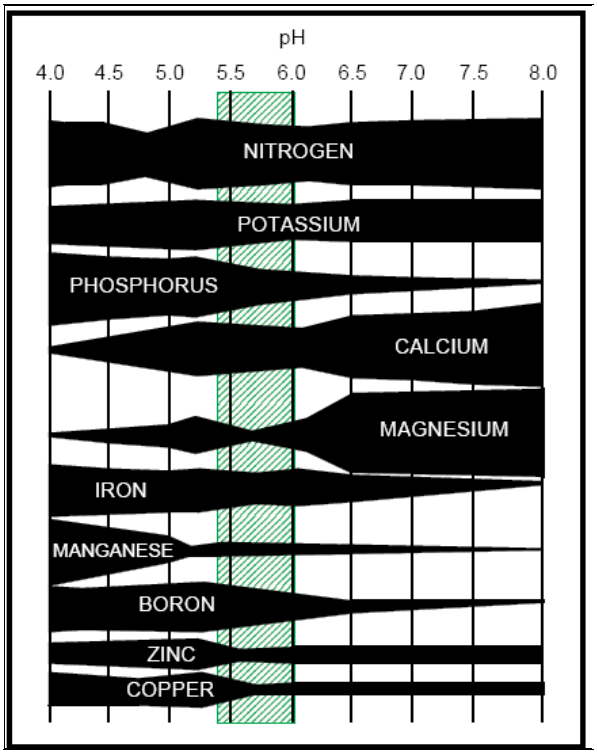
When root zone solutions have a pH of 7.0 and above (ie are basic), micronutrients like iron, manganese, zinc and boron are insoluble and unavailable for roots to absorb, resulting in nutrient deficiencies. Although your inclination may be to supplement the plants with the missing nutrient, your real long term solution is to lower the pH thus allowing these nutrients to become available.

Low pH issues

The same micronutrients that are insoluble under high pH conditions are very soluble and available to the plant under low pH (under 4.0) conditions. Nutrient toxicity can readily occur under these conditions. The long term solution is to keep the media pH in the proper range of 5.5 to 6.5.

Correcting pH problems

Start with the media – media like sphagnum peat, coir, pine bark and composts are usually acidic. Alkaline media includes items like hardwood bark, vermiculite, rock wool and rice hulls. Neutral media include perlite, sand and polystyrene. Depending on your ingredient preference, the media may be acidic. Limestone is often added to adjust the pH to a more desirable level. Make sure the limestone is evenly dispersed within the mix. It is common to find large variations in the pH of the media due solely to poor mixing. Commercially purchased mixes can also have large pH variations from bag to bag and lot to lot.



Water and pH

The Alkalinity level of your water may need to be adjusted to properly manage your container pH. Alkalinity is the ability of water to neutralize acids due to the dissolved alkalis (bicarbonates) in the water. The greater the amount of dissolved alkalis in the water, the more acid will be needed to neutralize it. Think of alkalinity as "liquid limestone". The primary source of alkalinity in ground water aquifers, rivers, ponds and lakes are limestone deposits that have reacted with water over time. Throughout the seasons, water levels within aquifers can change. High water levels can dilute alkalinity levels just as low water levels can concentrate them. Sample your water 2 or 3 times during the year as you notice conditions change. If your samples show significant change, then you know that more regular sampling is necessary.

High alkalinity water will tend to raise the pH of media over time. Yellowing on the upper leaves of pepper and tomato transplants can be an indication of iron deficiency brought on by high media pH. This is seen fairly often and can result in poor transplants. The more you water, the more liquid limestone is delivered, the more your pH rises.

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Alkalinity is measured in ppm of $CaCO_3$ (calcium carbonate). For greenhouse use, water that is moderately alkaline (80-120 ppm) is considered ideal. With low alkalinity levels, pH fluctuation can occur very rapidly. Moderately alkaline water will provide a slight buffering effect to help moderate wide pH fluctuations. If your water alkalinity is high, it can be lowered by injecting acid into your irrigation system using a proportioner. Citric acid can be used in organic production, and sulfuric acid is commonly used in conventional production. In our area, most growers have high alkaline water and adding acid should be considered. High alkalinity water can also degrade the active ingredient and effectiveness of certain pesticides.

Fertilizer and pH

How does the fertilizer affect the pH of the media? Ammonium and urea are acid forms of nitrogen and tend to lower the media pH. Nitrates are basic forms of Nitrogen and tend to raise the pH. Many commercial fertilizers are combinations of all the nitrogen types. The label should indicate how acid or basic the fertilizer is. As an example, a 21-5-20 fertilizer has a potential acidity of 400. This means the pH effect of an application of one ton of 21-5-20 would be neutralized by 400 pounds of calcium carbonate limestone.

Regular weekly monitoring of pH in your container media is not complicated and should prove worthwhile. *-TR*

Best Practices with Potato Seed

Every year when my potato seed arrives, I struggle with how to cut it – are there enough eyes on the piece, is the piece to big or too small. My father instilled upon me early when we used to cut potato seed together that there be at least 2 eyes on every piece. His thinking was, if there is only one eye and something happens to it, you're out of luck and that seed piece is a waste. Then, you have a skip in the field and where this is no plant there is no yield and no income! Not to mention a skip means more open areas for weeds to germinate etc. It's easy to do when you are hand cutting your seed, but more difficult when using a machine to cut your seed.

The best information I have found on this topic is by Steven Johnson from the University of Maine. We have excerpted most of the article and pictures from the bulletin, but not all of it. If you want to see the full Bulletin, either go to http://www.umext.maine.edu/onlinepubs/pdfpubs/2412.pdf or call me (859-6213) and I will send a copy to you. *(CDB)*

Potato Facts: Selecting, Cutting and Handling Potato Seed by Steve Johnson, University of Maine, Cooperative Extension Bulletin # 2414

Young seed piece

Middle-aged seed piece

Old seed piece

"No top"

Precutting Seed: Once good seed is selected, the decision must be made whether or not to precut the seed. Precutting seed potatoes involves warming the tubers, cutting them to size and cooling the seed pieces back down to a holding temperature**. Not all seed potatoes should be pre-cut. Only seed of young or middle physiological age should be precut, since precutting ages the seed.** Seed that is young can be precut up to one month before planting. If the seed has previously sprouted, the seed should be cut only two weeks ahead. Middle-aged seed can be precut up to two weeks ahead of planting only if it has not sprouted. **Middle-aged seed that has sprouted and been desprouted is old seed. Seed that is physiologically old should not be precut. Old seed should only be cut a few days ahead of actual planting. Cutting any earlier may cause aging and "Potato No Top".**

The temperatures at which to warm the seed and hold the cut seed vary from different aged seed. The younger the seed, the higher the cutting and holding temperatures. Young seed can be cut and held at about 50 degrees F. Older seed should not be warmed or held above 45 degrees F. Since sprouting ages the tuber, temperatures should be lower for seed that has already sprouted.

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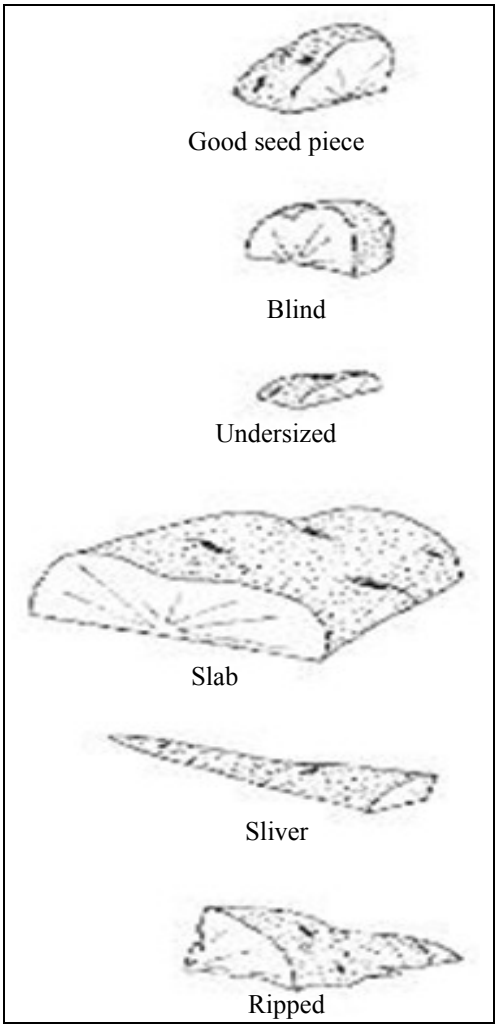
Adhere to temperatures and timing set by the physiological age carefully. Keep in mind that the cutting, the warming and the holding will all advance the physiological age of the seed. Remember, precutting is not for all seed. Planting fresh cut seed is recommended when seed needs to be planted right away.

Cutting Seed Pieces: Once good seed has been selected and the decision to cut has been made, proper seed cutting and handling is essential. Properly cut seed pieces feed correctly in the planter and provide uniform plant stands. Mechanical cutters can handle large volumes of seed and cut tubers into two or four pieces. Hand cutting minimized the number of blind pieces, but is slow and labor intensive. Potatoes should be warmed prior to cutting. Seed tubers should not be washed. Do not try to salvage diseased potatoes or those that are breaking down. Grade out bent or very rough tubers for hand cutting. Size seed potatoes before cutting. Tubers under 1.5 ounces should not be planted. Tubers weighing between 1.5 ounces but under three ounces should be planted whole. Three - to five-ounce seed tubers should be cut into two pieces. Five- to seven-ounce tubers should be cut into three pieces. Sort out seed over 10 ounces for cutting by hand, or, preferably, for sale to other markets. Disinfect all equipment before each seed cutting session and between seed lots. Calibrate the seed cutter daily and between lots. Keep the seed cutter knives sharp and straight to prevent ripping the potato surface. Ripping provides an ideal area for disease organisms to attach the seed.

Proper Seed-Piece Size: The size of a potato seed piece affects early plant vigor a great deal. Larger seed pieces usually emerge faster than smaller ones. Cut seed tubers into blocky pieces about 1.75 ounces in size. Discard poorly cut seed pieces, such as slivers or slabs. Remove seed pieces ripped or torn by dull knives. Each seed piece should have at least one eye. For varieties with poor eye distribution, such as "Atlantic" and "Shepody," consider cutting seed pieces closer to two ounces each. An ideal seed size range is between 1.5 ounces and two ounces. Seed pieces should average slightly larger at two to 2.5 ounces for "Russet Burbank" and similar varieties, with larger spacing between seed pieces. Seed pieces larger than three ounces many have some difficulty feeding through a planter. Planters require that at least 70 percent of the seed be in the 1.5 to three-ounce range.

Higher total yields are generally associated with larger seed pieces, but at some point the seed piece size will not result in increased yield. Bruise problems are more severe with very large seed pieces. Excess bruising increases the risk of seed decay problems. There is a greater cut surface area per seed piece with large seed. More stored energy will be used for wound healing and less is left to support new plant growth. Emergence will likely be slowed and plants will be less vigorous. A good rule is to keep the number of cut surfaces per tuber to a minimum. Undersized seed pieces can contribute greatly to the number of doubles or triples planted. Oversized seed pieces can cause skips and are also prone to fall out of the planter.



To assess your seed cutting operation, assess the weight distribution of the cut seed. If hand cutting, demonstrate the proper seed sizes and shapes to seed cutters. No more than 10 percent should be less than one ounce or more than 2.5 ounces. If there are 100 seed pieces in 10 pounds, the average size is 1.6 ounces; if there are 91 seed pieces, the average size is 1.75 ounces; if there are 80 seed pieces, the average size is two ounces. Count out 100 seed pieces and weigh them – 9.4 pounds would have an average size of 1.5 ounces, 10.9 pounds would have an average size of 1.75 ounces, and 12.5 pounds would have an average size of two ounces.

Curing Cut Potato Seed: Cool the cut seed to 38 to 40 degrees F (<45 degrees F), and do not pile it more than six feet deep. Good air circulation will keep the temperature uniform and prevent carbon dioxide buildup, which interferes with wound healing. Relative humidity levels of 85 to 95 percent are needed to promote healing and prevent dehydration.

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Six to 10 days at these conditions will complete the curing process. If there is too much air flow and not enough humidity, a thin skin may form on the cut surfaces. This thin layer is not enough to provide wound protection and can be easily sloughed off when handled. Warm the seed tubers before taking them from storage, unless sprouting is a problem. Re-warm seed again for two days before planting to get sprouts growing again and to avoid condensation on the seed. Remember that this practice does not overcome deficiencies of poor quality seed.

Handling Cut Seed: Care in handling cut potato seed is perhaps the most underrated aspect of commercial potato production. Cut potato seed is much more easily bruised than whole potatoes of similar weights. The most vulnerable areas of the seed pieces are the edges of the cut surfaces. Very small impacts can damage cells on the edges of the cut seed. These damaged areas allow decay organisms present on the seed or in the soil to infect the seed piece. Damaged cells may not heal. The number of cut surfaces on the seed piece affects the rate of emergence, the rate of early growth, stem numbers, set, grade and final yield. The more cut surface area on the seed piece, the greater the seed decay potential, the slower the emergence, the more stored energy in the seed that is dedicated to wound healing and suberization and, therefore, the less that is left to support new plant growth.

Planting Quantity per Acre: The quantity of seed required per acre depends on the average seed piece size and the seed piece spacing. Larger seed has been shown to produce better yields in some varieties. Keep in mind, however, that many other factors besides seed piece size and physiological age of the seed piece determine the final yield. These include soil temperature at planting, accuracy of the planter, soil moisture, fertility and diseases.

Seed per Acre Requirements at 34- and 36-Row Spacing with Plant Spacing from 7 to 12 Inches

Row Spacing (in inches)	Plant Spacing (in inches)	1.75-oz. Seed Cwt./Acre	2.0-oz. Seed Cwt./Acre	2.25-oz. Seed Cwt./Acre	Seed Pieces per Acre
34	7	28.8	32.9	37.1	26,356
	8	25.2	28.8	32.4	23,061
	9	22.4	25.6	28.8	20,499
	10	20.2	23.1	17.3	18,449
	11	18.3	21.0	26.0	16,772
	12	16.8	19.2	21.6	15,374
36	7	27.2	31.1	35.0	24,891
	8	23.8	27.2	30.6	21,780
	9	21.2	24.2	27.6	19,360
	10	19.1	21.8	24.5	17,424
	11	17.3	19.8	21.8	15,480
	12	15.9	18.2	20.4	14,520

Meetings and Notices

St. Luke's Cornwall Hospital is considering a workplace CSA. Please contact Ray Range at 845-344-1234 if you are interested in being the farmer-provider as he is coordinating with SLC staff.

Welcome to the first 2013 ENYHP Weekly Vegetable Update Weather Table. This information is being provided to you so you can see what is going on near you and throughout the rest of the area in regards to degree day accumulations and precipitation as well as comparing where you stand this year compared to last year at the same time. There are a few comments I wanted to make before we go any further. We selected the sites below as a representative sample of the 17 counties we cover. The data is compiled and available for anyone to look at on NYS Integrated Pest Management Programs Network for Environment and Weather Applications website at http://newa.cornell.edu/. The service is free to use and has a lot of great information including insect and disease forecasting applications for vegetables, field crops and fruit. I highly suggest that if you haven't visited the site before, take a look and see all that it offers.

In the table below you will find the number of Growing Degree Days (GDD) at the temperatures base of 50° Fahrenheit for the previous week and the total accumulated GDD's for the site since March 1, 2013. We use 50° Fahrenheit as our base because many of our crops use this for their minimum temperatures to grow. However, if you are growing for example onions, greens and cole crops you can choose to use Base 40° Fahrenheit as that is the minimum temperature for those crops. You can compare this to the total number of GDD's from the previous year, 2012 for the same time period. We also give you the precipitation for the week, the total for the season (since March 1, 2013) and so you can compare from last year, the total rainfall from March 1, 2012 to the same date used in the 2013 calculations. During the season we will use the GDD's to alert you to potential insects that might be emerging or hatching etc. Likewise, the precipitation, temperature and in some cases, leaf wetness levels will be used to determine potential disease outbreaks or favorable infection periods for example.

If you have questions or comments about the table, the information provided in the table or a site, please do not hesitate to contact Chuck Bornt at 518-859-6213.

Weekly and Seasonal Weather Information

	Growing Degree Information Base 50° F			Rainfall Accumulations		
Site	**2013 Weekly Total** 4/9—4/15	**2013 Season Total** 3/1 - 4/15	**2012 Total** 3/1—4/15	**2013 Weekly Rainfall** 4/9—4/15/(inches)	**2013 Season Rainfall** 3/1—4/15 (inches)	**2012 Total Rainfall** 3/1—4/15 (inches)
Albany	**6.5**	**7.1**	**114.0**	**1.35**	**3.93**	**1.66**
Castleton	**9.5**	**11.6**	**114.4**	**0.25**	**0.84**	**1.66**
Chazy	**0**	**0**	**98.3**	**1.42**	**2.84**	**1.83**
Clifton Park	**4.0**	**6.1**	**110.0**	**1.46**	**3.74**	**1.76**
Clintondale	**18.5**	**22.0**	**95.0**	**NA**	**NA**	**1.83**
Glens Falls	**1.5**	**2.0**	**56.5**	**1.40**	**4.53**	**1.39**
Granville	**2.0**	**2.0**	**77.0**	**1.27**	**4.22**	**2.14**
Guilderland[1]	**4.5**	**5.0**	**96.5**	**0.07**	**0.33**	**1.57**
Highland	**19.3**	**25.6**	**147.5**	**0.85**	**1.20**	**2.16**
Lake Placid	**0**	**0**	**NA**	**1.13**	**2.78**	**NA**
Montgomery	**18.9**	**23.0**	**110.0**	**0.76**	**3.16**	**1.33**
Monticello	**13.5**	**15.3**	**69.5**	**0.01**	**0.04**	**0.55**
Redhook	**12.6**	**15.3**	**123.5**	**0.75**	**2.27**	**1.78**