

Vegetable News



Transplant Stress

Teresa Rusinek, CCE Eastern NY Commercial Horticulture

Growers are eager to move transplants out to the field and, as it happens all too often, the weather has not been cooperating. Throughout Eastern NY we've generally had cool and wet soils, lots of windy days, and cool temperatures throughout May. Now it seems things are turning around with temperatures forecast in the 80s for much of the week. Environmental extremes and windy weather can adversely affect transplants after you've pulled them out of an ideal greenhouse environment and into the harsh conditions of the field. Transplant shock or stress is a setback in growth and it can happen for a variety of reasons, some which you as the grower may or may not be able to control. Finding a window of ideal weather for transplanting can prove to be a serious challenge.

Symptoms of stress can be severe, wilting, drying of leaves and stems, and in severe cases full plant collapse and death can occur. Plant species vary in their ability to reestablish growth after transplanting. The best adapted include: tomato, lettuce, cabbage, brussel sprouts and broccoli. Celery, onion, pepper, eggplant and cauliflower are considered intermediate but are often successfully transplanted. Legumes and sweet corn have slow root re-development, but can be transplanted successfully if root disturbance is kept minimal. Transplanting taproot crops such as turnips, beets or carrots generally causes root deformation.

Tips on how to reduce transplant shock/stress:

- Use bigger cell trays to lessen competition, smaller cells produce transplants with a smaller root system more vulnerable to damage.
- Plants grown in individual cells prevent root entanglement with neighboring plants.
- Grow seedlings to optimal age for transplanting. Transplanting at early seedling stage reduces transplant shock, however roots must be developed enough to avoid damaging during removal from cells. Very old transplants may have initiated reproductive growth rather than vegetative growth. Root bound plants take longer to re-establish.
- Avoid shoot or root pruning or drying, damage to roots will reduce establishment especially in melons, cucumbers and squash.

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- Using a starter solution at or just before transplanting can reduce transplant shock.
- Harden off plants- "hardening" refers to any treatment that results in a firming or hardening of plant tissue. Hardening results in an increased level of carbohydrates in the plant permitting a more rapid root development than occurs in non-hardened plants.
- Reduction of temperatures, fertilizer (particularly nitrogen), and moisture or exposure to outdoor conditions for 7 to maximum 10 days prior to transplanting will help plants to acclimate to outdoor conditions. Caution: Overly hardened plants are slow to get started.
- Watch weather forecasts; avoid transplanting during unfavorable weather conditions. Watch for frosts, wind, and very hot temperatures especially if planting on black plastic which can cause injury to lower leaves and the stem, enough to cause the death of the plant. (see article on heat necrosis in this issue)
- Inadequate water at transplanting can lead to losses.
- Use of row cover can help minimize wind, insect and frost damage but be careful of overheating transplants on warm



Left: Newly transplanted brassicas with significant wind and cold damage.
Right: Same transplants three weeks later. Photos: T. Rusinek

days. Some crops such as tomato and pepper will need wire supports to keep row cover from damaging plants.

- Plant so that soil covers the root ball so that it is not exposed to drying. In the case of watermelons and cantaloupes, make sure that soil does not surround the stem.
- Deep planting in cold wet soils will result in additional stress.

Heat Necrosis in Transplants on Black Plastic Mulch

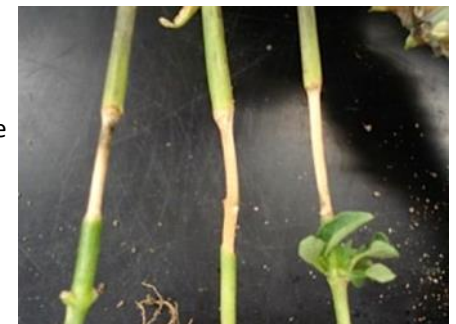
Gordon Johnson, University of Delaware Cooperative Extension, Kent County

Black plastic can heat up to well over 110 F on hot days in the late spring and summer. Vegetable transplants are exposed to these high soil temperatures at the soil line around the transplant hole. The stem tissue just at or above the level of the plastic will be killed at these high temperatures and the transplants will then collapse and die. Small transplants do not have the ability to dissipate heat around the stem as roots are not yet grown out into the soil and water uptake is limited. Another factor in heat necrosis is that there is little or no shading of the mulch with the leaves of small transplants.

There are a number of practices that can reduce heat necrosis in later planted vegetable transplants:

- Avoid using tender transplants that have not been hardened off.
- Use larger transplants with greater stem diameters and more leaves to shade.
- 'Leggy' transplants that lay across plastic mulch and even those transplanted onto bare ground are prone to sunscald injury.
- When transplanting into the plastic, make sure the stems of transplants do not touch the plastic once set. Make a larger planting hole, cutting or burning out the plastic.

- Water sufficiently in the hole to reduce heat load.
- Plant in the evening once the plastic has cooled down or in the very early morning. Avoid transplanting on very hot days or when extended hot, sunny weather is forecast.
- Switch to white or aluminized plastic mulch for later plantings. This will reduce the heat loading significantly.
- In smaller plantings you may paint the planting zone on the black plastic mulch white with latex paint and then plant through this white strip once dry. You can also mulch around the planting holes with wet straw to reduce heat loading.
- Use overhead irrigation after planting to keep the plastic cooler.



Sunscald injury on the stems of newly transplanted pepper seedlings, which is caused by stems laying against edges of black plastic mulch on hot, sunny days. Note that the secondary pathogens such as *Alternaria* can infest bleached-out areas of stems over time. Photo: Andy Wyenandt

Be On the Lookout for Cucumber Beetles!

Crystal Stewart-Courtens, CCE Eastern NY Commercial Horticulture

Cucumber beetles are active in the region, so make sure to scout and appropriately protect cucurbits. Young transplants and direct seeded cucurbits are a priority to protect because cucumber beetle feeding early on can vector bacterial wilt, a disease which can kill plants during hot, dry weather and/or heavy fruit set. Many conventional growers choose to treat either seed or transplants with a systemic insecticide which will protect them for a few weeks, after which point additional sprays will be needed to control new adults which fly in. Organic growers can either use row cover or a coating of Surround (kaolin clay) to protect transplants, followed by insecticide sprays later in the season. Both organic and conventional growers should time any insecticide applications to avoid harming the bees. This generally means spraying in the late afternoon/evening.

If scouting for cucumber beetles, check the flowers of older cucurbits first, as this is a very favored location. However, all stages of cucurbit will be fed on.

Striped cucumber beetle feeding on recently emerged cucurbit.
Photo: C. Stewart-Courtens



Spinach Leafminer on Beets and Chard

Crystal Stewart-Courtens and Amy Ivy (retired), CCE Eastern NY Commercial Horticulture

The last few years have brought particularly high spinach leaf miner pressure throughout Eastern NY on spinach, beets, and chard. Growers have reported having to abandon crops and spending significant amounts of time sorting out leaves ruined by these tiny maggots. The fly overwinters as pupae in the soil and hatches in late April and May in a typical year, and a little later this year. The adult fly then lays eggs on the leaves and the resulting larvae begin their damage. The oblong white eggs, less than 1 mm long, are laid in neat clusters on the underside of the leaves. They are easy to spot if you scout by looking under the leaves. The maggots may migrate from leaf to leaf down a row. They become fully grown in just a few weeks and drop into the soil to pupate. The entire life cycle is 30 -40 days. There are three to four generations per season. Typically mid-late May, late June and mid-August are peak activity periods.

Organic growers may try to exclude these insects from crops, though the covers need to be applied prior to emergence to be effective and insects will quickly find their way to the crops even during harvest. In the case of an infestation, Entrust (spinosad) has been found to have some effectiveness because of its translaminar properties. Conventional growers can use Coragen (chlorantraniliprole) for crops nearing harvest (1 Day PHI), or Trigard (cyromazine) or Agri-Mek (abamectin) for crops that are still growing (7 day PHI)

If affected leaves are manually removed (a recommended though tedious task), make sure that they are destroyed through shredding, burning, or deep burial to ensure that larvae do not survive and emerge during the next flight (usually in late June to early July).

Some suggestions to prevent an infestation next year include rotating the location of these goosefoot family members to a new location and covering the planting with rowcover immediately after seeding/planting. Remember that this pest overwinters as pupae in the soil, so rotation away from that site will be key before putting rowcover over the new planting. Finally, be sure to control weeds from this same family such as Lambsquarter, which can be alternate hosts.



Left: Extensive damage to beet and Swiss chard foliage in late spring high tunnel crop. Middle: Spinach leafminer larvae are visible in their tunnels on the left side of this beet leaf. On the right side of the leaf is older damage that turns tan then brown after larvae drop to soil to pupate. Photos: A. Ivy
Right: Spinach leafminer eggs. Photo: UNH Extension

Post-Emergent Sweet Corn Herbicides

Chuck Bornt, CCE Eastern NY Commercial Horticulture

It's hard to believe that two weeks ago we were seeing snowflakes and some snow accumulation on the ground; now today it is going to be close to, if not in, the nineties! I guess in this crazy world, why would the weather be any different? However, with the cold spring that we had and the variable moisture levels, my thoughts turn to what the weed control looks like in our early sweet corn plantings, especially those that were under row covers or plastic. Corn under plastic that I looked at last week had weeds nearly as tall as the corn and after driving by some row cover corn and seeing the cover pretty tight, I assumed it was probably more weeds than the corn doing the pushing! Warmer temperatures will also ensure that our weeds are growing which in many cases makes the post-emergent herbicides work better and can also make them safer on our crops as they are able to metabolize the herbicides quicker, therefore reducing the injury.

The post-emergent materials to choose from can be found in Table 1 on page 5, but there are a couple of other things you will need to know before making your selection. First, you need to know what weeds you are going after. Some materials are very specific and only control a narrow spectrum or even a couple of species so you need to know what it is you have in your field. Second, you will need to know the stage of your sweet corn in order to know if you can broadcast the materials or use drop tubes to keep the herbicides out of the whorl in order to reduce the chance of injury to the crop. As always, you need to really pay attention to the labels of these materials.

In order for these herbicides to perform their best and have the best crop safety, you need to know which adjuvants are required and how to use other additives such as a nitrogen. Read the labels to make sure that the chemicals and, almost as important, the additives are compatible. This is not only for crop safety, but efficacy of the materials used too. To assist you with that, see Table 2 to help determine which additives are recommended for the different herbicides, **but this is no substitute for reading the product labels!** **Please also be very aware of the "Post Harvest Interval" or PHI for some of these materials, especially if you are using them on plastic or row cover corn as you may be cutting it close between applications and harvest!**

Stinger is one material that is highly effective, but on a very narrow range of weeds. It is effective on ragweed, certain nightshades and Canada thistle. I have also seen it hurt wild buckwheat and Jerusalem artichoke, but not completely kill it. You are allowed two applications of Stinger per season not to exceed 2/3 of a pint total per acre per season. The recommended rate is 0.33—0.66 pints per acre. If you use the highest rate of 0.66 pints, you have used the maximum amount allowed for the season. See the label for more specific information on this material and if you are thinking of using any of these products with the ones mentioned earlier, please consult the labels to determine if they are compatible.

Impact or Armezon have proven to be quite effective on many of the annual grasses that can be found in our local fields while being pretty safe on the corn. However, I have seen it used on grasses that were very tall and saw it stunt and turn it pure white, only to have them come back a few weeks later and start to regrow. So the key with these materials is to use them when the grasses are small and make sure you follow the label and add the specific adjuvants and nitrogen sources. In trials we did several years ago, the addition of ¼ - ½ lb of atrazine improved control and residual when added to these products, so keep that in mind as well. With that said, please be sure to read the paragraph entitled "Notes about Atrazine" due to the concern of atrazine rates and carryover the next growing season.

Callisto is another product that can be used post emergent and is decent material for quite a few broadleaf weeds like lambquarters, pigweed, smart weed, nightshades, mustards and velvetleaf. It also has activity on small annual grasses like crabgrass and some of the foxtails, but does not control barnyard or panicums so knowing which grass species you have is very important! You also need to be aware that if you used any of the pre-emergent pre-mixes that contain Callisto (or the active ingredient mesotrione) such as Lumax, Lexar or Accuron, you should not use Callisto post emergent. The rates of Callisto by itself post emergent and the rate that was in the pre-mixes exceeds the maximum use rate for mesotrione.

Halosulfuron or Permit/Profine/Sandea are also labeled for sweet corn and will control several tough broadleaf weeds such as pigweed, small velvetleaf and ragweed and mustards. Where I have seen this product work well is on yellow nutsedge – but the nutsedge has to be big with at least 3-5 leaves to be the most effective and a second application may still be needed. The use of a non-ionic adjuvant is required for optimal control. If using on sweet corn, Permit is the cheaper choice, but is not labeled on any other vegetables. Profine and Sandea are both labeled on sweet corn and many vegetables.

Notes about Atrazine: Many of the products mentioned will benefit from the addition of 0.25—0.5 pounds of product with atrazine active ingredient. As atrazine has been one of the key materials used in our pre-emergent programs, it has been recommended that vegetable growers not use more than 1.5 lbs of active ingredient of atrazine per acre per season. This is so that other vegetables can be planted the following season without worrying about atrazine carryover and injury issues on those crops. Lumax, Lexar and Acuron have all become a popular pre-mix pre-emergent herbicide and each contain atrazine. At the recommended rate of 2.5 quarts per acre, there is 0.62 lbs. of actual atrazine (active ingredient) in those mixes, which means you can still use up to 0.5 lbs of atrazine in your post-emergent applications and be safe for next season's vegetables. For example, if you have in your shed

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AAtrex 4L (4 pounds atrazine per gallon) and you want to add 0.25 pounds as part of your post emergent mix, you would add 1/2 pint of

AAtrex 4L. Also, the label states that atrazine should not be used on corn taller than 12" in height. For assistance with calculations of other formulations, contact Chuck Bornt at 518-859-6213.

Product (active ingredient)	Pre-harvest interval	Weeds controlled	Rate	Comments
Impact or Armezon (topramezone)	45 days	barn-yard grass, fall panicum, foxtails, crabgrass, lambsquarter, ragweed and velvetleaf	0.75 fluid ounces	Best control will also occur if broadleaf weeds are less than 4" tall and grass weeds are less than 3" tall. It is also recommended that 0.25—0.5 lbs active ingredient of atrazine be added to improve weed control and residual. Weeds need to be actively growing and coverage is essential. In tall corn, I recommend drop nozzles be used in order to get the spray material down through the canopy and onto the weeds Adjuvants: Methylated seed oil (MSO) or petroleum-based or vegetable seed-based oil concentrate (COC, HSOC) at 0.5 to 1.0 gallon per 100 gallons of water [0.5% to 1.0% volume/volume (v/v)]. Nitrogen Fertilizer: nitrogen-based fertilizers include urea ammonium nitrate (UAN; 28% or 34%) at 1.25 to 2.5 gallons per 100 gallons of water (1.25% to 2.5% v/v) or a spray grade ammonium sulfate (AMS) at a minimum rate of 8.5 to 17 pounds per 100 gallons of water.
Armezon Pro (topramezone + dimethenamid-p)	50 days	Broadleaves and several annual grasses (barnyard grass, crabgrass, Giant Foxtail, Wild Proso Millet)	For sweet corn and popcorn label recommends 20 fluid ounces per acre	Best control will also occur if broadleaf weeds are less than 4" tall and grass weeds are less than 3" tall and actively growing. Applications can be made from corn emergence to 12-inches tall. DO NOT apply within 50 days of harvesting sweet corn ears. Adjuvants: Armezon PRO Alone: Methylated seed oil (MSO) or petroleum-based or vegetable seed-based oil concentrate (COC, HSOC) at 0.5 to 1.0 gallon per 100 gallons of water [0.5% to 1.0% volume/volume (v/v)]. Tank Mixtures with Armezon Pro: Use nonionic surfactant (NIS) at 0.25 to 0.5 gallon per 100 gallons of water [0.25% to 0.5% volume/volume (v/v)]. Oil-type adjuvants (COC, HSOC, and MSO) may be used in tank mixtures with Armezon PRO, however, combinations with these adjuvants can cause elevated necrosis within a few days after treatment and occasionally crop height reduction. Oil-type adjuvants are not recommended when tank mixing with atrazine. Nitrogen Fertilizer: nitrogen-based fertilizers include urea ammonium nitrate (UAN; 28% or 34%) at 1.25 to 2.5 gallons per 100 gallons of water (1.25% to 2.5% v/v) or a spray grade ammonium sulfate (AMS) at a minimum rate of 8.5 to 17 pounds per 100 gallons of water.
Accent Q (nicosulfuron plus a safener)		Mostly annual grasses	0.9 ounces per acre	Accent Q will provide post emergent control of most annual grasses (limited crabgrass control) and if applied alone has very little broadleaf control (Redroot pigweed). If additional broadleaf control is also needed, consider tank mixing Accent Q with another herbicide listed in the label. Applications of ACCENT® Q may be applied broadcast or with drop nozzles (post-directed) on sweet corn up to 12 inches tall or up to and including 5 leaf-collars (V5). For sweet corn 12 - 18 inches tall, apply only with drop nozzles. Do not apply to sweet corn taller than 18 inches or those which exhibit 6 or more leaf-collars (V6). DO NOT APPLY ACCENT® Q to corn previously treated with "Counter" 15G or to corn treated with "Counter" 20CR in-furrow or over the row at cultivation. Applications of ACCENT® Q to corn previously treated with "Counter" 20 CR, "Lorsban", or "Thimet" may cause unacceptable crop injury, especially on soils of less than 4% organic matter. Adjuvants: Crop oil concentrate (COC) or Non-Ionic Surfactant (NIS) plus a sprayable grade ammonium nitrogen such as UAN or AMS. See label for specific rates and uses.

Supplemental labeling for Accent Q tank mixed with Impact and atrazine – If using this combination, the user must have in their possession a copy of this supplemental label! Accent Q may be applied with 0.5 – 0.75 fluid ounces per acre of Impact plus 0.375 – 1.5 pounds per acre active ingredient atrazine (12 – 48 fluid ounces of a 4L formulated atrazine product). However, if you have used any atrazine containing pre-emergent products, the general rule of thumb for rotating vegetables the following year after using atrazine is no more than 1.5 pounds total active ingredient per acre. More than that and you greatly increase the potential for atrazine injury to susceptible crops.				
Permit/Profine/Sandea (halosulfuron)	30 days	Broadleaves (pigweed, velvetleaf, ragweed) and Yellow nutsedge	0.67 ounces per acre	<p>Apply Permit over the top or with drop nozzles from the spike through layby stage of the corn. Treat young actively growing broadleaf weeds 1 to 3 inches in height.</p> <p>Adjuvants: Nonionic Surfactant (NIS) is required in the spray solution. Use NIS at 0.25 to 0.5% v/v concentration (1 to 2 quarts per 100 gallons of spray solution). Do not use COC or MSO as the potential for injury is too great.</p> <p>Nitrogen fertilizers: May be added but are not necessary for post-emergent applications. Apply a high quality, granular spray grade ammonium sulfate at a rate of 2 to 4lb/A or a liquid nitrogen fertilizer solution (e.g. UAN 28%) at a rate of 2 to 4 quarts/A.</p> <p>Use of soil or foliar applied systemic organophosphate insecticides on PERMIT treated crops may increase the potential for crop injury and/or the severity of the crop injury.</p> <p>Do not apply SANDEA using air assisted (air blast) field crop sprayers</p>
Stinger (clopyralid)	30 days	Broadleaves (ragweed, wild buckwheat, Common cocklebur, Jerusalem artichoke, Canada thistle)	0.33 – 0.66 pints per acre	<p>Apply Stinger any time after sweet corn emergence through 18-inch tall sweet corn uniformly with ground equipment as a broadcast or directed spray in 10 to 20 gallons total spray volume per acre.</p> <p>Do not exceed 2/3 or 0.67 fluid ounces per year.</p> <p>Do not apply to sweet corn that is greater than 18" tall.</p> <p>Control of common cocklebur, common ragweed, giant ragweed, sunflower, other annual weeds and Jerusalem artichoke, apply 1/4 to 1/2 pint of Stinger per acre from weed emergence up to the 5-leaf stage of growth.</p> <p>I would recommend using Stinger alone and not in tank mixtures at this time.</p>

Table 2: Comparison of adjuvants and other additives used in post-emergent sweet corn herbicides. This is not a substitute for reading the herbicide labels.

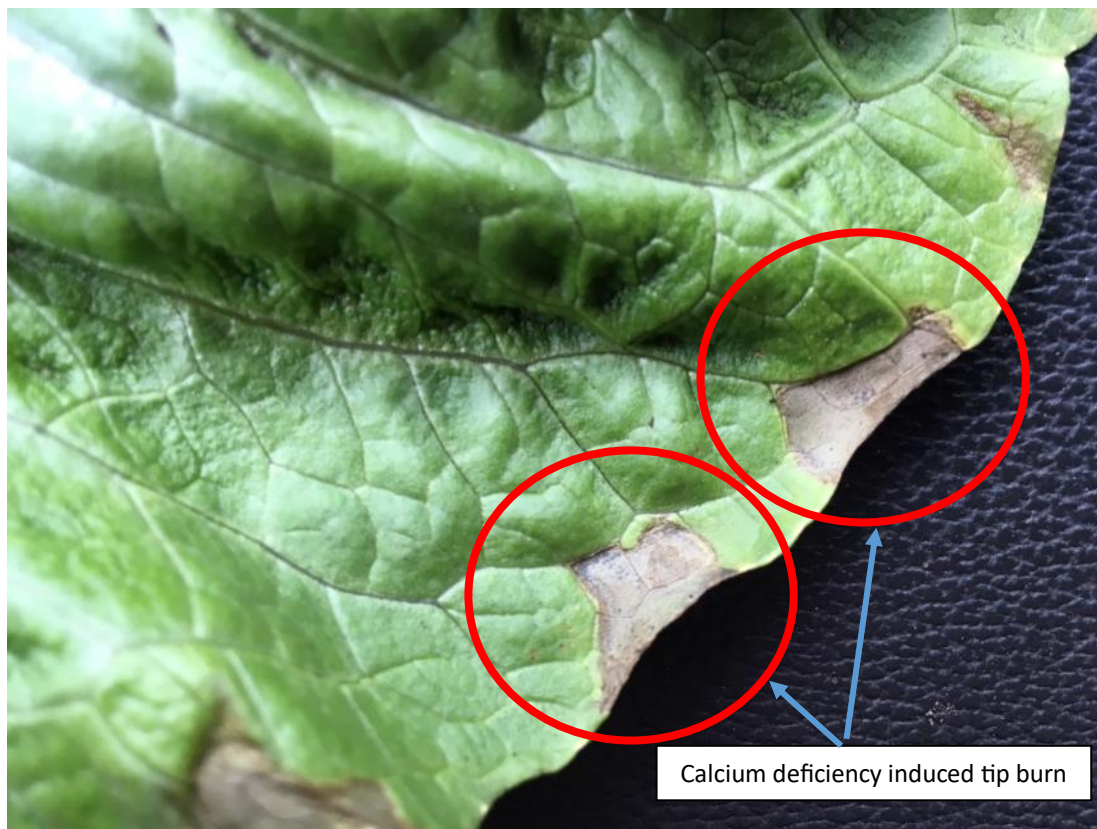
Herbicide	Crop Oil Concentrate (COC)	Non Ionic Surfactant (NIS)	Methylated seed oil (MSO)	Nitrogen (UAN or AMS)
Impact/Armezon	X		X	X
Armezon Pro (used alone)	X		X	X
Armezon Pro (in tank mixes)		X		X
Accent Q	X	X		X
Permit		X		X
Callisto	X	X		
Stinger				

Environmental Causes of Tip Burn on Transplants

Ethan Grundberg, CCE Eastern NY Commercial Horticulture

The cool, overcast, and wet spring posed a number of challenges in propagation greenhouses. Fungus gnat infestations, foliar diseases, Pythium root rot, and ammonium toxicity were all consequences off the uncooperative weather. Now that we've experienced excellent growing weather for over a week, some growers are beginning to notice another abiotic disorder: tip burn.

Calcium deficiencies in transplants can be another consequence of the short day lengths, overcast skies, cool temperatures, and high humidity that characterized most of the spring. Growers who have battled blossom end rot in tomatoes or tip burn in lettuce likely already understand that these disorders are, technically, caused by calcium deficiencies at the growing point of plants. However, the true culprit is typically not a calcium deficiency in the soil or growing



Calcium deficiency induced tip burn

Photo: E. Grundberg

media, but rather erratic watering that prevents the calcium in the soil or potting mix from becoming soluble and being taken up by plants. Getting the calcium into the roots is just the first part of the battle, however.

Calcium is not mobile within plants; instead, it is carried through the plant vascular system along with water that is being sucked through the plant by the process called transpiration. The small openings along leaves, stomata, open up to take in carbon dioxide for photosynthesis and release water in the process. This transpiration is what drives water movement up to the new growth points on plants and, in so doing, carries that calcium to the rapidly growing leaves to reinforce cell walls. What happens to transplants in a cool greenhouse at 95% relative humidity without supplemental light? They transpire exceptionally slowly and don't move calcium to the leaf margins. What happens when such conditions are followed by really warm weather and full sunlight? Plants grow and transpire quickly, but can't immediately supply the calcium demand at growth points which can result initially in small brown spots along the leaf edges that eventually turn papery and can be quickly colonized by secondary foliar pathogens.

Extensive research on tip burn has shown that supplying extra calcium through foliar feeding or fertigation will NOT help plants avoid calcium deficiencies if they are growing under low transpiration conditions. What can growers do to avoid calcium deficiency induced transplant tip burn?

1. If heading into a period of cold, wet days, minimize watering. Don't be afraid to use gable end vents or ridge vents if it is too wet in the greenhouse!
2. Try to avoid dramatic temperature swings through supplemental heating, venting, and shade cloth; if plants have been grown in the mid-50s, a sudden surge into the 90s can lead to excessively quick growth that results in tip burn.
3. Don't panic! Most plants will outgrow early calcium deficiency symptoms once they're in the field under more consistent growing conditions. However, tip burn on quick turn baby lettuces and other leafy greens both reduce the crop's shelf-life post-harvest and, even if minor, can make them unsellable.
4. Don't throw water on a grease fire! It's easy to think providing extra calcium will help a plant experiencing a calcium deficiency. However, if the potting mix has sufficient calcium and the deficiency is environmentally-induced, adding extra calcium can actually interfere with the plant uptake of other essential nutrients like magnesium and potassium

How to Take a Photo for Crop Diagnostics

Elizabeth Buck, CCE Cornell Vegetable Program

Capturing diagnostically useful images is not as simple as snapping a picture of cute children or animals.

With the current push to work remotely, using pictures to quickly address production questions has a lot of appeal and utility. I love the idea of using grower-captured photos to hasten the trouble-shooting process, especially since it isn't always possible to make prompt farm visits. But in practice it can be quite tough to work out a problem using photos because of poor image quality.

High quality diagnostic photos absolutely can allow us (and other ag professionals) to make pretty confident IDs and assessments of what is going wrong. I frequently send diagnostic images to our plant pathologists for a preliminary read on the situation, it works great. Examples of high quality diagnostic images are regularly published in our pest/disease/weed management articles.

What makes a high quality image?

A high quality image has 3 key components:

1. The image matches exactly what you are seeing. Same colors, same level of detail.
2. The image is well focused on the intended subject (is "sharp").
3. The image captures the correct part of the field, plant, bug, etc. to make an ID.

In practice, meeting these three criteria takes some time. I typically spend 3-5 minutes capturing a series of high quality images to use in VegEdge or to send off to our plant pathologists or entomologists.

Things you should know:

Cameras sense a lot more light than our eyes can. Our eyes saturate with light and stop perceiving increased light well below the level of light that a camera (and plants) can perceive. This is why images taken in a sunny field tend to be over exposed and look washed out relative to what your eye perceives. The camera is showing you how much more light there is than you can physically realize. In a way, the camera is better than our eyes at showing us the relative amount of light a plant "sees".

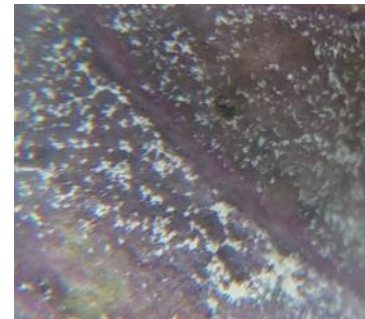
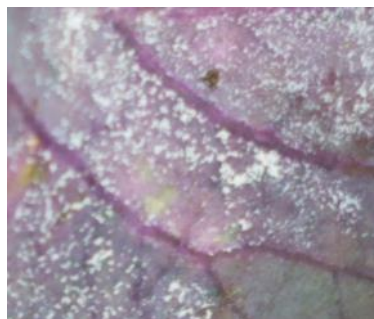
So much of diagnostics relies on picking out slight color differences in plant tissue. Sunglasses alter how colors look. Something that stands out well with sunglasses on may not be as distinct with them off. I cannot pick out the slight yellow checkerboard of early stage cucurbit downy mildew when I scout with my sunglasses on because my shades filter out light in a way that changes the appearance of yellow objects. Cameras don't filter light and color the same way as your sunglasses do. It is difficult to get the photo to capture exactly what someone wearing sunglasses perceives – far easier to take shades off.

Making an ID usually takes at several photos. This number changes based on the problem. Insects can be done in as little as 1 or 2 high quality pictures. Weeds and feeding damage on crops usually require 2-3 good images. Plant diseases and mystery problems are almost always 3-5 photos. Remember that disease symptoms can vary from the upper and lower sides of leaves and images of both can be helpful.

Different problems need different images:

The easiest question to answer with a good photo is "what's this bug".

- ✓ For insects you see, take a focused close-up of the pest. A couple images showing feeding damage, any frass, and where on the plant you're finding the damage can ID pests you don't see.
- ✓ To ID caterpillars, a top shot showing its head and a side shot of its pattern are really useful.
- ✓ For broadleaf weeds, take photos of the overall growth habit, a detail shot of some middle aged leaves, and one showing flowers or any other distinctive features like spines or rosettes.
- ✓ For grasses, a picture of the growth habit and a close-up, a focused image showing where the leaf meets the stem while you gently tug on the leaf blade will work well.
- ✓ For diseases causing foliar symptoms, include the overall plant, the portion of the plant showing symptoms but not yet fully destroyed, and a focused close up of the symptom. For example, with septoria of tomatoes, I'd take pictures of a couple of staked plants showing that the problem is worst lower on the plant and that there is mud splashed up on the lower leaves, the next photo would be of a mid-aged leaf that is starting to yellow and is showing lesions, and the last photo would be a close up of a mature lesion showing the surrounding tissue and a pale lesion with black specks in the center.
- ✓ For diseases causing root symptoms, abiotic issues, or mysteries, take a picture of the field where the problem is occurring, a whole plant above-ground photo, pictures of any above-ground symptoms on the foliage, a shot of what the roots look like, and an image of the crown sliced open vertically.



Need a close up shot of some mold? Left: Zoomed in image vaguely shows downy mildew sporulation on a brassica seedling. Right: By taking the image through a hand lens, greater detail including the separation of individual mold colonies and the structural shape of the sporulation can be seen. Note image is clear near the central leaf vein and blurry on the edges due to the effect of the hand lens.

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Steps for taking a high quality image:

1. Clean off the lens of your camera before taking an image.
2. Clean up the area around the subject. Push unwanted leaves out of the way, pull up weeds. This will help the camera isolate the subject from the background and improve the sharpness.
3. Take off your sunglasses so you can match the image exactly to what you see.
4. On bright days, hold your ball cap bill over the phone to shade the lens & reduce oversaturation.
5. Stabilize the camera. Prop your elbow on your knee, ribs, the ground, stakes, etc.
6. Center the focal point on the subject.
7. Zooming in too far blurs an image. Better to adjust your distance from the subject first, then zoom so you maintain sharpness and level of detail.
8. Adjust the lighting (white balance) of your image before taking the photo! This is the last thing you do before taking an image. Many phones have a little sun icon that you can slide higher or lower. Make the colors match what your eye sees.

Pro Tips:

- **Windy day?** Take leaves off plants, especially for shots of feeding damage and diseases. Place on any non-reflective surface like the ground, a truck seat, or even your pant leg.
- **Really tiny bug or something you saw with a hand lens?** Hold the scouting lens up to the camera lens. Move closer or further from the subject to take macro shots, don't zoom. The hand lens will distort the edges of the image, so make sure the subject is in the center.
- **Bugs moving around too much?** Catch them and toss them in the freezer over lunch. They'll be dead or very slow at the end of lunch and they'll still have all their original coloring.
- **Having trouble focusing sharply on the subject instead of the background?** Try using portrait mode on your phone. Or, put your hand directly behind the subject to obscure the background and refocus your image. Once it refocuses, remove your hand and quickly take the picture. This requires one-handed picture taking so be sure to stabilize the camera.



Effect of adjusting the lighting setting. **Left:** overexposed image captured by just snapping a photo. **Right:** Same seedling, with **white balance adjusted** so screen display matches what the eye sees prior to taking the photo. The **photo on the right** shows the outline and wide range of discoloration (tan, bronze, yellow), which **allows for a downy mildew diagnosis**. The same diagnosis cannot be made from the image on the left.



Correct focus point. Pepper seedlings with discoloration on the cotyledons. **Left:** Camera focused on leaves behind the scarring, leaving the lesion blurry and small. Too much extra foliage in the image. **Right:** Brought camera closer to subject, re-set the focus on the lesion, and stabilized the camera by resting elbow on edge of the bench. **These three actions yielded a sharper image that shows two different injury patterns** – coppery sunken tissue in the center with no yellow margins and reddish-brown lesions with yellow margins moving in from the edge of the leaf.



Caterpillar ID. **Left:** Blurry, curled up caterpillar photo zoomed in on worm's side marking pattern. **Center:** Sharper view of same caterpillar taken by shifting camera angle, placing subject and camera lens in the shade of a ball cap to remove the shadow, and bringing the lens closer to avoid distortion caused by zooming. **Right:** Caterpillar glamour shot showing both top and side patterns of the caterpillar, useful for ID.



Use of portrait mode. **Left:** Image of necrotic leaf is blurry while the background soil is in sharp focus. **Right:** By using portrait mode, the downy mildew infected leaf becomes **sharp** and isolated from the background soil. The added sharpness reveals the darkening lines and veins in the chlorotic upper left part of the leaf, despite the right image being taken from a greater lens distance than the image on the left.

Show Me the (COVID-19) Money!

CFAP for NYS Fruit and Vegetable Farms

Elizabeth Higgins, CCE Eastern NY Commercial Horticulture



Show me the (COVID-19) Money is an attempt to help NYS fruit and vegetable farmers navigate the crazy, constantly changing world that is the government's economic response to COVID-19. Buckle-up its going to be a fun ride!

You will note that this issue's dollar photo is tiny, because although some NYS fruit and veg farms may qualify for CFAP payments, the actual amount of the payment for most fruit and vegetable farms won't be very large. CFAP helps agricultural producers impacted by the effects of the COVID-19 outbreak by providing direct payments to producers of eligible commodities. BUT if you also have livestock, dairy or field crops your situation with CFAP might be better.

Generally, to be eligible for a CFAP payment, a specialty crop producer must have sold (or tried to sell) a crop between January 15 and April 15, 2020 that USDA has determined suffered a 5- percent-or-greater price loss over a specified time resulting from the COVID-19 outbreak or faces additional significant marketing costs for unsold inventories. These would be crops harvested in FY2019 and in storage or crops that matured and were ready to sell in January-April.

The list specialty crops that USDA has determined are currently eligible for some type of CFAP payment are: Almonds; apples; artichokes; asparagus; avocados; beans; blueberries; broccoli; cabbage; cantaloupe; carrots; cauliflower; celery; corn, sweet; cucumbers, eggplant; garlic; grapefruit; kiwifruit; lemons; lettuce, iceberg; lettuce, romaine; mushrooms; onions, dry; onions, green; oranges; papayas; peaches; pears; pecans; peppers, bell type; peppers, other; potatoes; raspberries; rhubarb; spinach; squash; strawberries; sweet potatoes; tangerines; taro; tomatoes; walnuts; watermelons. Other specialty crops will be announced in a future NOFA (Notice of Funding Availability) as losses due to COVID-19 market disruptions are better understood. In particular, nursery crops and cut flowers are under consideration.

There are three possible payments for eligible crops:

- ✓ CARES Act Payments for crops that USDA has determined had a five percent-or-greater price decline in sales price that were sold between January 15, 2020, and April 15, 2020.
- ✓ CARES Act Payments for eligible crop shipments that left the farm by April 15, 2020, and spoiled due to no market or the buyer did not (could not) pay.
- ✓ CCC Payments for eligible crops that did not leave the farm by April 15, 2020, (for example, were harvested but sitting in crates on the farm), or mature crops that were unharvested by that date (for example, were plowed under) due to lack of buyers, and which have not been and will not be sold. This could also include crops that were donated.

Payments for eligible specialty crops will be 80% of the sum of:

- (1) For eligible specialty crops that were sold between January 15, 2020, and April 15, 2020, the quantity sold multiplied by the payment rate in **Column 2**; Producers must maintain records, such as a bill of sale, documenting that they sold the crop and the amount sold.
- (2) For eligible specialty crops listed that were harvested and shipped off the farm between January 15, 2020, and April 15, 2020 producers must obtain documentation, such as a letter from the buyer, explaining non-payment or other record validating non-payment. This applies to producers who have met contractual obligations in delivering the crop to the buyer, but have not been paid, the harvested and shipped quantity that spoiled (or was unpaid) multiplied by the payment rate in **Column 3**.
- (3) For eligible unpriced specialty crops listed that did not leave the farm or mature crops that remained unharvested between January 15, 2020 and April 15, 2020 due to loss of marketing channel, the sum of the quantity of crops that did not leave the farm (in acres in this case) or the quantity of mature crops that remained unharvested, multiplied by the payment rate in **Column 4**.

CFAP could be useful for greenhouse producers with tomatoes or lettuce and producers who sold dry onions, potatoes, apples, cabbage or garlic from January 15th to April 15th, especially if you had any unsold inventory between January 15th and April 15th of those crops or did not receive payment for crops that you shipped. Nursery growers who suffered significant losses should also apply with FSA as it is likely that there will be a benefit, but the agency does not have enough data yet.

(Continued on page 11)

Table 1: Example Eligible Crops and Payment Rates – full list of crops and payments is available on page 33 of the final rule <https://www.farmers.gov/sites/default/files/documents/CFAP%20Final%20Rule.pdf>

Example Eligible Crop	Column 2 crops you sold that USDA determined had losses	Column 3 crops that left the farm to be sold, but pmt. not received	Column 4 mature crops that never left the farm (could have been donated)	Payment for 1000 lbs in each category
Apples	\$0.00	\$0.18	\$0.03	$\$0 + \$180 + 30 = \$210$
Cabbage	\$0.04	\$0.07	\$0.01	$\$40 + \$70 + \$10 = \210
Garlic	\$0.00	\$0.85	\$0.17	$\$0 + \$850 + \$170 = \$1,020$
Romaine Lettuce	\$0.07	\$0.12	\$0.02	$\$70 + \$120 + \$20 = \210
Mushrooms	\$0.00	\$0.59	\$0.11	$\$0 + \$590 + \$110 = \700
Dry Onions	\$0.01	\$0.05	\$0.01	$\$10 + \$50 + \$10 = \70
Potatoes	\$0.00	\$0.04	\$0.01	$\$0 + \$40 + \$10 = \50
Strawberries	\$0.84	\$0.72	\$0.14	$\$840 + \$720 + \$140 = \$1,700$
Tomatoes	\$0.64	\$0.38	\$0.07	$\$640 + \$380 + \$70 = \$1,090$

Should you apply?

USDA-FSA has a payment calculator on the CFAP page (<https://www.farmers.gov/cfap>) that you can use to estimate what your CFAP payment is likely to be. This will help you determine if it is worth applying. Unless you sold a lot of an eligible crop, or experienced considerable losses from non-payments or mature crops going bad due to loss of markets, CFAP will probably not be that useful to most NYS specialty crop producers. Future losses aren't covered as the crops needed to be mature and harvested by April 15th. However, payments for dairy, livestock and field crops may be more favorable. If you also produce these products you should definitely investigate CFAP.

USDA is aware that there are likely to be some specialty crops that suffered losses that weren't included. If you suffered significant losses from a specialty crop that isn't covered, USDA is collecting data to consider including other crops. Examples of these could include maple syrup, and nursery plants. Definitely contact FSA if you produce a specialty crop that suffered losses that aren't reflected here.

What do you Need to Apply?

Sign-ups for CFAP began on May 26th and will run through August. The application for CFAP will be available at <https://www.farmers.gov/cfap>. Forms are on-line.

All applicants need to be signed up with USDA FSA to be able to apply for these funds. If you have NAP, have had a USDA-FSA loan or have USDA NRCS cost-share funding you are probably already in their system. If not, to start the process you will need to provide:

- Name and address
- Personal information, including your Tax Identification Number
- Farm operating structure
- Adjusted Gross Income compliance certification to ensure eligibility
- Direct deposit information to enable payment

Because USDA disaster payments almost always require you to be signed up with FSA, even if CFAP payments are not much, signing up with USDA-FSA would get you into the USDA system to be eligible for future programs. Also, by being in the system, USDA is more likely to see how disasters impact your farm.

Events & Updates

Online Paraquat Dichloride Safety Training Now Available in Spanish and English

Julie Kikkert, CCE Cornell Vegetable Program

How to Safely Use and Handle Paraquat-Containing Products is the EPA approved online course from eXtension, available at <http://www.usparaquattraining.com> with the recently released Spanish version now available in addition to the English version. The training website address is available on all paraquat labels.

As required by EPA's Paraquat Dichloride Human Health Mitigation Decision and amended paraquat dichloride (a.k.a. paraquat) product labels, certified applicators must successfully complete an EPA-approved training program before mixing, loading, and/or applying paraquat. The training provides important information about paraquat's toxicity, new label requirements and restrictions, and the consequences of misuse. According to the eXtension site, you should expect to spend about 60 minutes on the course and the assessment quiz. You will need to create an account within eXtension, and when the training is completed, you can print off a certificate of completion.

COVID-19 and Animals

Source: Michael Westendorf, Rutgers Cooperative Extension, Plant and Pest Advisory, May 22, 2020

Currently, there is no evidence that animals play a significant role in spreading SARS-CoV-2, the virus that causes COVID-19. Based on the limited data available, the risk of animals spreading COVID-19 to people is low. In some rare situations, people may be able to spread the virus to animals. Further studies are needed to understand if and how different animals could be affected by the virus, and the role animals may play in the spread of COVID-19. The clinical spectrum of illness for the SARS-CoV-2 virus remains largely undefined in animals. Animals may present with respiratory or gastrointestinal clinical signs based on the presentation of other coronaviruses more commonly found in animals as well as other emerging coronaviruses, including SARS-CoV-1 infection. Clinical signs expected to be compatible with possible SARS-CoV-2 infection in mammalian animals may include fever, coughing, difficulty breathing or shortness of breath, lethargy, sneezing, nasal/ocular discharge, vomiting, and diarrhea.

Although there have been limited reports of domestic companion animals testing positive for COVID-19, the risk of transmission from animals to humans is thought to be low. Routine COVID-19 testing is not recommended.

Please see the following factsheet from the State Department of Agriculture Division of Animal Health :

[COVID-19 and Animals.](#)

Corn Trap Counts

County	ECB-E	ECB-Z	FAW	WBC	CEW
Ulster 2	11	6	0	N/A	0

*More traps will be placed in the next two weeks as plantings are uncovered.

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