Start Managing for Bacterial Diseases in Field Tomatoes at Transplanting for Best Results

Crystal Stewart-Courtens, CCE Eastern NY Commercial Horticulture

Bacterial speck, spot, and canker continue to be perennial problems in Eastern NY. We are learning that effective management is a season-long effort, starting with proper greenhouse sanitation and continuing with regular plant protection. The good news is that there are more tools available for disease management than once thought; the bad news is management is more intensive than we’d like.

Start with clean stakes

This is a best practice because of other tomato diseases too, so hopefully you are already cleaning your tomato stakes. Every year wooden and metal stakes should be power-washed to remove excess soil, then sterilized using either bleach, Green-Shield, Xero-Tol, or an equivalent product. It is important for the stakes to sit in a sterilizing solution long enough to penetrate the nooks and crannies of the wood and kill any lurking bacteria or fungal structures. Remember that bleach will damage metal stakes if not rinsed off.

Protect Plants Starting Early

Bacterial diseases are most effectively controlled by preventing their infection. It’s
not always clear where inoculum comes from, but we know that growers who have struggled with bacterial diseases in the past are having some success with starting a protective spray program shortly after transplanting. The traditional spray for both organic and conventional growers has been copper; however, there is concern about applying the amount of copper per season that would be needed to provide continuous control. Dr. Christine Smart has been doing trialing of alternatives to copper for bacterial canker and bacterial speck, and has found that there are products equally effective to copper available on the market.

It’s important to protect leaves because fruit quality will decrease as the plant weakens and is defoliated. However, fruit quality is downgraded by just one lesion. According to Dr. Smart, bacterial infection of fruit occurs before it reaches ping-pong size. Keeping fruit protected prior to this point will effectively result in lesion-free fruit. This knowledge may adjust timing of sprays.

Because copper and other products such as Actigard have, on average across bacterial diseases, equal efficacy, alternating between them could help with resistance management and will reduce copper loading in the soil. All of these products wash off in rains, so protecting weekly or between rain events is recommended for best results with field tomatoes.

One quick note—you will notice that none of the products listed are antibiotics. There are no antibiotics listed for vegetable production—products listed are either broad spectrum biocides, such as copper, stimulate plant immunity, such as Regalia and LifeGard, or competitively colonize the leaf and suppress other bacteria, such as the *Bacillus* products.

### Weed Control Between Plastic Mulches

**Chuck Bornt, CCE Eastern NY Commercial Horticulture**

I know that many of you are chomping at the bit to get some warm season crops planted in the field (and some of you might have already) like zucchini and yellow squash, but it doesn’t look like that’s going to happen until later in the week or even next week with temperatures forecasted into the low to mid 30’s again this week! However, there is an opportunity to get some plastic mulches laid and try to get some of that field work done ahead of time so you are ready to roll when the time comes to plant. One of the challenges and questions I get about this time every year is what to do about weed control between the rows that are not covered by the plastic mulches? Unfortunately, I don’t have a silver bullet for you, but I do have a couple of thoughts.

The cardinal rule and the first thing that I would tell you is **DO NOT APPLY ANY HERBICIDES BROADCAST OVER THE TOP OF THE MULCHES BEFORE PLANTING**!!!! I think you are taking a risk that even after a couple of rains that the herbicide may remain on the plastic and could concentrate in the planting hole after you’ve planted with a rain – especially in cases where beds are not uniformly full and you have dips in your beds where water can gather on the plastic. The best figure I heard of in regards to what that could
mean is the concentration of the herbicide that washes off of a 1 square foot area of plastic into a planting hole can be 48 times the intended rate! I think the best method is to fit the field, lay your plastic and then using either very directed sprays or better yet, a shielded sprayer, apply the herbicides between the beds, just letting the spray contact the shoulders of the bed. I’ve seen some homemade shielded units made from plastic totes to old wooden apple crates! The best units I’ve seen are the shielded sprayers from Crop Care.

My rule of thumb for row middle application is, if the material is labeled on the crop, then it can be used in the row middles too unless otherwise specified on the label that it cannot be used between the rows. Using a pre-emergent or combination of pre-emergents before transplanting is the best strategy in my mind as you minimize the risk of drift and hitting your crop. However, if you can’t get right in there to apply after laying your mulch and you’ve planted and weeds are already starting to grow or some of your cover crop didn’t completely get turned in, I would recommend tank mixing in a contact herbicide such as gramoxone (or other formulations of the active ingredient paraquat) plus a non-ionic surfactant (and an anti-drift material if you have one) to your pre-emergent materials as a shielded, directed spray. Why paraquat instead of glyphosate (Round-Up etc.)? Paraquat will only kill what it comes in contact with (so coverage is essential). So if a little drift moves onto your plant, it will only kill the area that it comes in contact with and leave some tan spots. Whereas a small amount of glyphosate will translocate and potentially kill or really hurt your crop and I’d rather be safe than sorry. And paraquat is quickly degraded by sunlight so if it does get on the plastic it shouldn’t wash into the planting holes and cause any issues.

For organic growers, I’ve seen very good results with mulching using straw or some type of hay mulch or using some type of permeable landscape fabric or weedmat (Figure 1) pinned to the sides of the beds. If you are using organic mulches like straw or hay, be sure to apply a thick layer of mulch, at least 6” thick when finished. However, with early plantings, this may prevent beds from warming which is one of the reasons we use plastic mulches. Careful, shallow cultivation with a Hillside or Lilliston cultivator or a combination of S-tines and spyder cultivators and can also be fairly effective in controlling weeds between the beds of plastic. Although tricky, the use of a shielded flame weeder for row centers could also be considered. Conversely, in the summer these organic mulches between the rows are helpful in maintaining soil moisture and cooling temperatures in beds where cool season crops such as late season brassicas might be planted. There is also research evaluating the use of “living mulches” such as a small grain combined with a clover or other shade tolerant, low growing legume. More information from our Cornell Vegetable colleague Judson Reid can be found at: https://rvasadmin.cce.cornell.edu/uploads/doc_202.pdf

Stale seed bedding or the practice of allowing a flush of weeds to germinate then shallowly incorporating or killing with a non-selective herbicide and then planting a crop (or allowing another flush of weeds to germinate) is also common. Another option for growers is the use of tarps. Tarping, as it is referred to, is the use of applying impervious, light blocking plastic sheets, applied over an entire area for a period of time anywhere from 3 to 6 weeks. As temperatures warm up, weeds seeds germinate but because there is no light, they soon die. The key is to have all of the field prep done prior to applying the tarps and then once removed, disturb the soils as little as possible as to not bring new weed seeds to the surface. The time to leave the tarps on mostly depends on what time of the season it is and how warm it will be in order to get the weed seeds to germinate. We have also seen where tarps have been used to smoother or kill cover crops. One of the more common tarps used are what the livestock folks use to cover their bunker silos or silo covers. They generally can be used for several seasons (depending on how you take care of them), come in larger sizes and are fairly reasonable price wise. If your production blocks are smaller, the sheets can be cut down. A great resource for tarping is the Cornell Small Farms Program. You can find lots of information at their website: https://smallfarms.cornell.edu/2019/07/manage-weeds-with-tarping/

Below is a list of some herbicides that could be used between rows of plastic mulch on various crops. This is not to be used in place of a label as in some instances a product may be labeled on some but not all crops in the same family (for example when I say brassicas, that includes cabbage, broccoli, etc., but these products may not be labeled on all members of the brassica family so please read the label before using).

![Herbicides Labeled for Between Rows (row middles) of Plastic Mulches on Various Vegetable Crops](https://example.com/labels)

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Crop(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Magnum*</td>
<td>Tomatoes, Peppers, Cucurbits, some Brassicas, Lettuce, Onion (Indemnified label*)</td>
</tr>
<tr>
<td>Prefar (bensulide)</td>
<td>Eggplant, Peppers, Cucumbers, Melons, Squash, Brassicas, Lettuce</td>
</tr>
<tr>
<td>Sandea (halosulfuron)</td>
<td>Tomatoes, Cucumbers, Melons, Squash, Watermelon, Peppers, Eggplant</td>
</tr>
<tr>
<td>Prowl H2O (pemidemethalin)</td>
<td>Eggplant, Pepper, Tomato, Onion, Brassicas</td>
</tr>
<tr>
<td>Reflex* (fomesafen)</td>
<td>Tomatoes, Peppers, summer/winter squash (Indemnified label, note PHI for these crops)</td>
</tr>
<tr>
<td>Dimetric, Sencor (metribuzin)</td>
<td>Tomatoes</td>
</tr>
<tr>
<td>Strategy (clomazone + ethalfluralin)</td>
<td>Cucumber, Melon, Pumpkin, Squash</td>
</tr>
<tr>
<td>Command 3ME</td>
<td>Winter/summer squash, pumpkins, sweet potatoes, peppers, cucumbers, melons, cabbage, broccoli</td>
</tr>
</tbody>
</table>

*Dual Magnum and Reflex are 24C Special Local Needs Labels and require specific “Indemnified” labels through Syngenta in order to use them on these crops. To register go to: https://www.syngenta-us.com/labels/indemnified-label-login and follow the directions. This needs to be done every year in order to use these materials on these crops.
Vegetables that have been transplanted in the last week risk significant losses due to the cold, rainy, and cloudy conditions.

To more fully explain this problem, it is necessary to understand how different vegetables regenerate roots and how this affects plant survival after transplanting. As has been discussed previously, soil temperature is very important. Rate of root growth or regeneration is temperature dependent with cool season vegetables such as cabbage or lettuce being able to produce new roots at much lower temperatures than warm season vegetables such as eggplant or watermelon. In soils that are below critical temperatures (60-65°F for watermelon and cantaloupes for example) roots do not grow into the soil bed and transplants will be subject to desiccation losses as soils dry around the root ball. The smaller the root ball (the smaller the tray cell size), the more quickly desiccation and plant loss can occur. For solanaceous crops tolerance to cold soil is as follows: Tomatoes > Peppers > Eggplant. For cucurbits tolerance to cold soils is in this order: Cucumber > Summer Squash > Muskmelon = Watermelon.

A second problem relates to where plants can grow or regenerate new roots from. Solanaceous vegetables (tomatoes, peppers, eggplant) can generate new roots from both the existing transplant root system and also from stem tissue. Stem generated roots are called adventitious roots and in solanaceous transplants they can grow at any place along the stem above the root system. There is still some bare root transplant production of solanaceous crops because of this ability to regenerate roots.

In contrast, cucurbit transplants will only generate adventitious roots at above-ground nodes and no nodal tissue will be in contact with soils at planting time in the spring. Therefore, all new roots in cucurbit root systems that are damaged (torn or detached) during transplanting will not survive (solanaceous crops will). Cucurbit crops must be firmly rooted in the plant trays so they will pull out with no tearing, otherwise plant losses will occur.

Show Me the (COVID-19) Money! PPP and EIDL Edition
Elizabeth Higgins, CCE Eastern NY Commercial Horticulture

I’ve been churning out long, wonky fact-sheets on two SBA disaster programs; the Paycheck Protection Program (PPP) and the Economic Injury Disaster Loan (EIDL). Both are low interest loans with a grant component intended to help businesses cover routine operating costs during a disaster. Here is my summary in a nutshell:

1. Both combine a grant aspect and a low interest loan aspect.
   a. PPP allows up to 100% loan forgiveness for payroll, rent, utilities and mortgage interest paid in the 8 weeks directly

(Continued on page 5)
(Continued from page 4)

after receiving the loan. The part that is not forgiven is a 1% loan with no fees. Must be paid back in 2 years.

b. EIDL Advance (up to $10,000) is the portion of the EIDL you receive prior to final approval to help cover immediate needs. This portion does not need to be reimbursed. The loan portion of EIDL is a 3.75% loan with no fees. Repayment time periods vary, up to 30 years.

2. Farms are eligible for both programs. Right now ONLY farms are able to apply for EIDL.

3. Both are first come, first served – with a finite level of funding. So interested applicants need to shake a leg. EIDL is low on $ and is only open to farms right now. PPP is open to all businesses and seems to be a little less of the land rush it was a few weeks ago.

4. Both programs might have tax implications, but the grants themselves are not subject to federal taxes.

Here is a side-by-side comparison:

<table>
<thead>
<tr>
<th>EIDL + Advance</th>
<th>PPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Loan Amount</td>
<td>$2 million (maybe $150,000? There are reports that SBA is lowering the cap, not confirmed by SBA)</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>3.75% (2.75% for non-profits)</td>
</tr>
<tr>
<td>Maximum Forgivable Amount (aka Grant)</td>
<td>You will receive an advance on the loan of $1,000 for every employee, up to $10,000 – you can keep this even if your EIDL loan is not approved.</td>
</tr>
<tr>
<td>Repayment Period</td>
<td>up to 30 years</td>
</tr>
<tr>
<td>Allowable Uses</td>
<td>working capital</td>
</tr>
<tr>
<td>Who is the Lender?</td>
<td>SBA</td>
</tr>
</tbody>
</table>

Should you apply?

I would certainly look at these loan programs. Unless you are sitting on a pile of cash and are not concerned about the impact of COVID-19 interruptions this season on your farm business, these loan programs (at a minimum) can provide your farm access to affordable working capital to help with cash flow this season. If all goes well, you would have paid these costs anyway and you should be able to afford to pay the loans back. If things go south, you might have trouble getting loans this affordable quickly. You shouldn’t borrow what you can’t afford to pay, and if you are looking at PPP, make sure you can meet the terms of forgiveness if your business margins are tight enough that you would be harmed by the loan.

Although the grant portions are targeted to specific items and must be used appropriately, having the grant could help to offset your higher costs in other areas for managing COVID-19 that may not be reimbursed. This can include additional mileage, credit card fees, cleaning supplies, loss of revenue from public events, possible overtime costs and the cost of caring for sick workers, should some of your employees become sick.

Farms in NYS are having success in accessing both the PPP and the EIDL + Advance. So, if you are not applying because you think it will be wasted effort, that does not seem to be the case.

Here are links to information about these programs:


Prior Fact Sheets about PPP and EIDL for more Information:


Fact Sheet #2 April 8th Update to the Paycheck Protection Program (PPP) – Where the only constant is change!, April 8, 2020 [https://bit.ly/2Yamx2Y](https://bit.ly/2Yamx2Y)

Fact Sheet #3 A new interim rule, the first round of funding is depleted. What does the future hold? April 14, 2020 [https://bit.ly/2ScV7pr](https://bit.ly/2ScV7pr)

Fact Sheet #4 PPP has$310 billion more + returned funds from large companies. $60 billion more for EIDL, is now available(ish) for farms. April 27, 2020 [https://bit.ly/3eWOinQ](https://bit.ly/3eWOinQ)

Fact Sheet #5 It’s not over until... The EIDL loan program reopens, but only for farms. Here is what you need to know to apply. Also, the PPP still has money! (and a few policy updates) – May 11, 2020 [https://bit.ly/3fHwJzG](https://bit.ly/3fHwJzG)
COVID-19: Farm Leadership Must Persevere to Victory
Dr. Richard Stup, Ag Workforce Development Specialist

“Never give in. Never, never, never.”
- Winston Churchill, Prime Minister of the United Kingdom, 1940-1945.

On October 29, 1941, Poland, France, Czechoslovakia, Belgium and the Netherlands had all fallen to the Nazis under the terrifying leadership of Adolph Hitler. The United States would not enter World War II until December of 1941, and so, Great Britain stood alone in the West, resisting the Nazi onslaught against the free world and resolving to fight on. The leadership of Winston Churchill was instrumental in preserving and strengthening the will of the British people to fight through those dark days and survive against what seemed insurmountable odds.

The COVID-19 pandemic has been likened to a war. The enemy is the novel coronavirus and it is a powerful, deceptive, and patient foe. We know how to fight it, we must deprive it of opportunities to spread and infect more victims. The CDC, the NY Department of Health, Cornell, and others have given us the training we need. NYS Ag and Markets and Cornell Cooperative Extension are distributing weapons across the state in the form of hand sanitizer and face coverings for the agricultural workforce. But, like WWII, this fight against COVID-19 will require leadership to help our people stay the course and fight on with perseverance and faith in our eventual victory.

Now is not the time to relax or let up in our efforts to combat COVID-19. While the rate of infection is declining overall in New York the virus is advancing in rural communities, including a recent attack at a large, upstate greenhouse. As I write this post, New York is making plans for a phased re-opening of business and the seasonal agricultural workforce is increasing in number to meet the needs of the vegetable and fruit growing season, conditions are ripe for coronavirus to spread in the farm workforce. Now is the time for farm managers to step up to leadership with gritty resolve and perseverance. “Never give in. Never, never, never.” as Mr. Churchill put it.

Perseverance in the war against COVID-19 means farm managers must:

1. Lead your team and reinforce the need to be vigilant and keep up good sanitation and social distancing practices. Communicate and re-communicate the value of prevention. People are growing tired of these burdensome new activities but leaders need to rally the troops for the good of everyone!

2. Provide the needed tools. Face coverings, cleaning solutions, brushes, buckets, mops, hand sanitizers, are the tools needed for this fight. Businesses need to provide these for employees to use in the workplace and at farm-provided housing facilities.

3. Develop the standard operating procedures (SOPs) for preventing COVID-19. Build simple and repeatable instructions to ensure that needed procedures are done right consistently. Link to CDC and OSHA recommendations for business.

4. Train employees in how to use SOP’s and tools. For permanent employees, now is the time to provide some re-training to reinforce what they learned already and eliminate any confusion or procedural drift. Our seasonal employees continue to arrive, this means that farm managers will have to train and re-train repeatedly as new recruits arrive at the farm. Make training for COVID-19 prevention tasks part of your employee onboarding and a key part of a manager’s job.

5. Assign cleaning details. Voluntarism is great but the fight against COVID-19 is too important to not lead assertively. Use your leadership authority and assign important tasks to individuals as part of their work. Assign cleaning in farm-provided housing also.

6. Manage for compliance with measurement, feedback and reinforcement. COVID-19 prevention tasks like cleaning and wearing face coverings are critical and it’s up to managers to see that they happen. Use tools like checklists and sign-off sheets for employees to indicate when tasks are completed, and spend time in the workplace observing the work being done. Give feedback, positive and re-directive as needed, to encourage employees and keep everyone on track.

And finally, leaders must model the behaviors they want in their followers. If you, as a farm manager, take shortcuts or flout the COVID-19 prevention rules, then your employees will surely do the same, and the enemy will find an opportunity. Your actions speak louder than your words so model the grit, determination, and most of all, perseverance, that it will take for us to “win through to absolute victory” over COVID-19.

Cornell Ag Workforce Development resources to fight COVID-19.

Manure Application Considerations for Produce Safety
Elisabeth Hodgdon, CCE Eastern NY Commercial Horticulture

This time of year, as I drive around our region, I see many growers spreading manure and preparing the soil for their crops. For diversified farms, animal manure is an important (and free!) source of fertilizer that reduces the need for off-farm nutrients and organic matter. However, raw animal manures can be a source of human pathogens, and thus pose a food safety risk if not managed carefully.

While the FDA continues to research food safety risks associated with raw manure application, food safety recommendations for now lean on the National Organic Program standards. Growers should apply manure no later than 120 days before harvest of a crop with edible portions growing in close contact with the soil, or 90 days before crops with edible portions that do not contact the soil. The “90/120 day rule” is known well by certified organic growers, and is recommended for non-certified farms as well. Leaving time between manure application and harvest allows for die off of pathogens in the manure through exposure to the elements—UV light, desiccation, and competition with soil microbes. For example, application of manure just prior to a quick growing radish crop would be much more risky than manure application prior to a long season Brussels sprouts crop producing its edible portion up off the ground.

In our region, there are many diversified farms that grow fresh produce as well as raise livestock. Rotating grazing animals amongst produce fields is a common practice, particularly for animals to consume crop residues. Produce growers using rotational grazing systems are encouraged to follow the 90/120 day rule as well, to reduce risk of pathogens from manure depositing while animals were in the field. If animal intrusion occurs during the season due to a broken fence or other mishap, a general inspection of the field should be conducted to identify contaminated produce that should not be harvested, i.e, produce contaminated with feces or potentially feces splash-back.

In our agricultural communities, a produce farm may share property lines with livestock farms. Neighbors spreading manure next to produce on a windy day can also pose a serious food safety risk, especially if the produce is close to harvest. To the extent possible, neighboring farms should work together to avoid manure drift onto produce.

As with all food safety practices, outlining standard operating procedures for manure application should be included in a farm food safety plan. Additionally, records of manure application are useful to document implementation of SOPs.
Events & Updates

Online Spotted Lanternfly Workshop
May 13, 2020
9:30 am—12:00pm

This is a meeting to update farmers and the general public about spotted lanternfly (*Lycorma delicatula*), a new invasive species that has the potential to cause severe economic injury to many important crops in Ulster County and New York State. This meeting will provide information on the biology of SLF, its preferred hosts, as well as economic injury sustained in Pennsylvania as a result of its introduction. This workshop will also cover some of the regulatory restrictions in place to limit the spread of SLF. **There is no cost to attend this meeting, however, pre-registration is required. CCEUC has applied for DEC pesticide credits. Register:** [http://ulster.cce.cornell.edu/events/2020/05/13/online-spotted-lanternfly-workshop](http://ulster.cce.cornell.edu/events/2020/05/13/online-spotted-lanternfly-workshop)

USDA Webinar for Producers Interested in Applying for Direct Payments through the Coronavirus Food Assistance Program
May 14, 2020
1:00pm—**Producers new to Farm Service Agency programs are encouraged to participate**

This webinar is an opportunity for producers to learn about the general application process and required documentation prior to the official beginning of signup. Producers interested in participating may register in advance for webinar at [https://www.zoomgov.com/webinar/register/ WN_SPWl7yOFSaGG1JKzhEbjA](https://www.zoomgov.com/webinar/register/ WN_SPWl7yOFSaGG1JKzhEbjA). After registering, you will receive a confirmation email containing information about joining the webinar. We encourage participants to submit questions through the Q&A box or by emailing CFAP.webinars@usda.gov. While questions will not be answered live during the webinar, answers will be posted at farmers.gov/CFAP.

USDA is hosting this webinar to share what information is needed to apply for direct payments through CFAP, once the application period begins. Producers who are new to participating in FSA programs are especially encouraged to join the webinar. More details about CFAP direct payments will be announced soon.

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](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.