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Vegetable News

Slug Weather

Crystal Stewart—ENYCHP

One creature which is benefitting from the cool, damp weather that has been such a feature of our spring this year is the slug. We are seeing damage on a variety of crops ranging from leafy greens, to transplants, to early strawberries. This weather is problematic because it increases the range on the farm in which slugs can easily travel. Where damage might normally be concentrated at field edges with good daytime habitat immediately adjacent, or in mulched fields, we are now seeing slug feeding on bare ground crops and throughout the field. How do you know it's slug damage? Look for irregular but smooth-edged holes or leaf margin feeding, and sometimes you can see the slime trails either on the leaves or on the ground around the plant.

The population of slugs is not affected by this particular patch of weather, since there is generally one generation of our most common pest slug here in New York per year. The slugs we have now are the eggs laid last fall. But how to get rid of them regardless of this fact? Sluggo, a mix of Iron Phosphate and slug bait, is the most common solution. It should be applied to the ground in between rows of plants, not on the plants. Note that it does dissolve and dissipate with rains, so timing your application between storms is a good idea.



Slug Damage— Crystal Stewart

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Avoiding Pepper Problems

Amy Ivy—ENYCHP

Peppers can be challenging to grow and this spring, with its ups and mostly downs in temperatures as well as gusty winds, is getting them off to a slow start in most locations. This summer we are doing a study at the Cornell Willsboro Research Farm comparing yields of peppers grown inside and outside a high tunnel as well as comparing 2 field varieties with 2 greenhouse varieties inside the tunnel. It will be interesting to see if the protection of the tunnel makes a difference in yield and ripening time.

Some of the key diseases to be on the lookout for in peppers include bacterial leaf spot, bacterial soft rot, *Phytophthora* blight and cucumber mosaic virus. For pests, keep a close eye on the new growth where aphids like to gather and watch out for boring into the fruit from European corn borers. Spider mites can damage the leaves and stink bugs (primarily brown marmorated stink bug) damage the fruit.

There are also a few disorders that can affect yield that can mostly be avoided with a little extra attention in the coming month.

Blossom End Rot – most growers know this disorder on tomatoes where it develops on the bottom end of the fruit where the blossom was attached. But in Peppers, the dead patch is more often seen along the side of the fruit. Just as in tomatoes, the key to avoiding this disorder is to keep a steady supply of water coming. If you see blossom end rot, take a good look at your irrigation set up because it's a sign that you're not providing enough, which inhibits calcium movement in the plant. Adequate moisture

allows calcium to move through the plant all the way out to the developing fruit. Since we are seldom

deficient in calcium, the key is providing enough water and avoiding any dry spells.

Sunscald – the trick to identifying sunscald is to look at the fruit as it sits on the plant and see where the damage is occurring. Sunscald kills the tissue on the topmost part of the developing fruit, where the sun hits the plant most directly. If the damage is on the underside or shaded side of the plant, it is not sunscald. The only way to stop this damage is to protect the fruit from the sun. The plant's own leaves usually do the job but if a branch breaks off or the plant is pruned too aggressively, sunscald can result.

Lodging – in sandy soils, especially in areas exposed to high winds, a plant laden with a heavy fruit load can simply fall over, or lodge, from the weight. A stake and weave trellis system will help support this load.

Breakage – pepper plants are quite brittle and entire limbs can easily snap off. This is especially true for plants grown under the protection of high tunnels which usually allow for lush, succulent growth. These broken branches often contain several developing fruit, which is quite a loss, and then the remaining fruit can be prone to sunscald from their sudden exposure to the sun. A stake and weave trellis system will also help in this situation. For greenhouse type varieties of peppers it is recommended to allow just 2 to 4 leaders to grow and train each to its own vertical string, as you would with indeterminate tomato plants in a tunnel.



Blossom End Rot— Photo by Amy Ivy



Sun Scald— Photo: omafra.gov.on.ca

Controlling Bacterial Diseases in Tomato

Teresa Rusinek- ENYCHP



Bacterial Speck on tomato fruit and leaves— Photo: Teresa Rusinek

I'm hopeful that this will be any easy year for controlling the three main bacterial diseases in tomato: bacterial speck, spot and canker. These are the fruit spotting, yield reducing bacterial diseases that have grown more prevalent in our fields. At this point, you've hopefully taken all

the precautionary steps such as sanitation, hot water seed treatments, and field rotation to keep disease from developing in your crops. But if you've had any of these bacterial diseases in the past, my experience has been that you have an increased risk of it showing up on the farm again. In this case, I would look at doing some preventative applications of copper before transplants go out into the field. Also, consider applying a plant activator fungicide that induce plant resistance, such as Actigard for conventional

production and Regalia or Double Nickel for organic production, all of these are labeled for bacterial spot and speck (unfortunately not canker). These products are recommended to be used PREVENTATIVELY with other fungicide products.

Tanos, when tank-mixed with full rate of copper fungicide, has some suppressive activity on speck, spot and canker, but I think using copper plus mancozeb or ManKocide, which is premix of mancozeb + copper hydroxide, is just as effective. The reason for mixing the two together is the addition of the mancozeb increases the effectiveness of the copper by releasing more of the copper ions. Gavel is also labeled due to the mancozeb component of the material, but must also be mixed with high rate of fixed copper. In an organic system, the grower is limited to OMRI approved copper formulations such as Champ or Cueva.

Trials conducted by Cornell plant pathologists Christine Smart and Margaret McGrath found Actigard (not approved for organic production) to provide excellent control of bacterial speck without a reduction in yield. They used 0.75 oz/A applied in a 100 gpa tank on a 7-day schedule. It takes at least three days for Actigard to induce plant defenses, so it is necessary to begin applications before symptoms appear on the plant.

White Rot Update

Crystal Stewart- ENYCHP

Last year we confirmed the presence of White Rot (*Sclerotium cepivorum*) in NY after an extended absence in this state. We've been monitoring the disease closely this year to try to understand its development in our climate, since most research has been conducted in warmer, drier climates. We are not seeing a severe outbreak now, but the disease is present where rotation hasn't been employed or disease infested seed has been used.

At this point the primary focus is still on understanding who has white rot and on employing



Progression of white rot as of 5/30/17.
Image: Crystal Stewart

cultural controls to reduce the spread and severity of this serious disease. Next year we will begin conducting organic and conventional control trials using all available products, in addition to continuing to stress cultural controls.

In the meantime, we ask growers to be on the lookout for flagging plants which, upon removal, have either white fuzz covering the underground portion of the stem and bulb or tiny black sclerotia, which are

the reproductive structures of this fungus (see image). You might need to dig up suspicious plants to see these symptoms, because the infested tissue is quite soft and may remain in the ground if you pull the plants.

If you see suspicious symptoms, please contact Crystal to confirm the presence of white rot. You can call or text to 518.775.0018, or email me at cls263@cornell.edu.

Botrytis Leaf Blight on Onions

Ethan Grundberg—ENYCHP

The first signs of botrytis leaf blight (BLB), caused by the fungus *Botrytis squamosa*, have appeared on volunteer onions and early season alliums in high tunnels around Orange County. BLB thrives under the environmental conditions that we have been dealt lately: high humidity, high rainfall, and temperatures between 50° F and 75° F. In order for the pathogen to infect leaf tissue, leaves must remain wet for at least 6 hours.

Early symptoms of BLB are small leaf spots surrounded by greenish-white rings on older leaves. These symptoms are most often observed first in cull piles and on bulbs left in the field or ditches, where BLB overwinters. Volunteers and cull piles then serve as a source of BLB inoculum for nearby transplanted and direct seeded onions since, if left untreated, the fungus begins to produce airborne spores under favorable environmental conditions. As the severity of infection progresses, the smaller lesions can coalesce, cause leaf dieback, and significantly reduce the yield potential for the crop.

Volunteer onions in fields and ditches, as well as cull piles with green growth from bulbs, should be destroyed now to eliminate early sources of BLB spores. Onion growers should also begin to scout fields for signs of BLB. The first fungicide application is recommended when the following three criteria are met: 1) an average of one Botrytis lesion per leaf is observed in the field, 2) the Inoculum Production Index (IPI) is 7 or higher (available from <http://newa.cornell.edu/index.php?page=onion-disease-forecast>), and 3) there is a 30% chance or higher of

rain in the forecast. As of Wednesday, May 31st, the IPI from the Montgomery weather station is only at 2.38 and I have yet to observe a BLB lesion average of one per leaf in a field of transplants or direct seeded onions. Given the wet and cool weather forecast for the next week, I'll reiterate that farmers should scout fields carefully, especially near cull piles and in fields with poor air flow, and have a fungicide program ready to go.

Based on field trials on the Elba Muck in Western New York, chlorothalonil (FRAC Group M5) containing products like Bravo have been most effective at managing BLB. However, it is important to rotate FRAC group numbers to avoid the development of fungicide-resistant BLB strains. Iprodione (FRAC Group E3) products, like Rovral, and azoxystrobin + difenoconazole (FRAC Groups 11 + 3) formulations, like Quadris Top, were found to provide moderate levels of BLB suppression and should be used in rotation with Bravo. For organic growers, Serenade (Bacillus subtilis QST 713 strain) and several copper formulations, including Cueva, are labeled for BLB management, but are more effective preventatively.



Be on the Lookout for Cucumber Beetles!

Crystal Stewart—ENYCHP

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: Crystal Stewart

Considerations When Planting Sweet Potatoes

Chuck Bornt—ENYCHP

I know that many of you have your sweet potato slips scheduled for this week and some of you might have started even last week! The weather unfortunately is not cooperating very nicely in order to get those slips planted. Nevertheless, I thought it might be worthwhile to review a couple things to make sure your sweet potatoes are at their best:

- 1) Try to plant them as soon as you receive your plants—do not try to hold on to them for more than a couple of days. If your plastic is laid (if you're using plastic) or your beds shaped ready to plant, but it's too wet to move planting machinery around in a field (like a waterwheel transplanter), I would think about trying to get whatever I could planted by hand. Nothing works better than a piece of 3/8" rebar to make a nice planting hole for that slip!
- 2) If you can't plant them right away, **do not put them in a cooler**—keep them in a cool, shady area. Coolers can be too cold and result in the plants getting injured.
- 3) If possible, **open the boxes and spread your slips** out if you can't get them planted right away – do not leave them in the boxes as they will heat and encourage them to breakdown quicker!
- 4) **Do not "soak" your plants in water!** This does not help and usually only makes them slimy and encourages bacterial breakdowns. If you need to hold your plants for more than 3 or 4 days, place them standing up in shallow trays filled with sand or potting mix and keep the media moist. Place the trays where it is cool and not in direct sunlight for extended periods of time – a table under a tree might just be the best.
- 5) Make sure the beds you are planting in are moist and maintain good moisture for at least 7–10 days after planting to ensure the plants start to root well.
- 6) Planting is probably one of the most labor consuming issues with this crop. Using a water-wheel is an OK way to plant, but in my experience if you are using a standard spike I see three problems: 1) it is too big and leaves too much area open; 2) This large hole allows weeds to get started and 3) the spikes don't necessarily make the holes deep enough (see

continued on next page

number 7 below for my reasoning)! If you can retrofit one of your wheels with either smaller spikes this will help reduce the weeds in the holes and may encourage less mice damage to the top of those roots later in the season. As stated above, a 3/8" piece of rebar is perfect for making a small, deep hole that you can just slip in the hole and pinch the soil around the slip. I've even used my soil probe before too!

7) Along with #6, the deeper the hole when you plant the better! Make sure your slips are planted as deep as you can get them without burying the growing point. Each slip will probably differ in how long and where the growing point is located – pay attention to this when planting. Each node along the stem is potential for more yield! Also, you don't have to remove the leaves, but in some cases removing some of the leaves on the bottom can help you get that plant into the hole that much quicker and those leaves will probably die anyway so you're not losing much but you are gaining valuable planting depth!

8) Spacing: Research we conducted several years ago indicated that, when using beds mulched with black plastic (30—36" wide), using a single row down the middle of the bed 12—15" apart or a double staggered row (like for peppers) at 18" apart in the row and 12" between the rows worked best.

9) Sweet potatoes can actually tolerate a wide range of pH levels, with the optimum between 5.8 and 6.3.

10) Most research indicates that 50 pounds of actual nitrogen is plenty and more than that we end up with more growth cracking and rough root appearances. Some varieties, such as Beauregard and Covington, are less sensitive to the nitrogen levels, but still do not require much more than the recommended 50 lbs. Excess nitrogen will also just encourage more top growth and more of those long skinny roots that are unmarketable.

11) Sweet potatoes require a lot of potassium: rates are 120—150 pounds of actual potassium. Potassium helps ensure uniform roots and has been indicated in improving flavor and storability.

12) Sweet potatoes require moderate amounts of phosphorous with 60 pounds per acre as the general recommendation. However, these levels should be adjusted to your soil type and frequent soil nutrient testing.

The last bit of information that I'll leave you with is while doing some recent reading, it was brought to my attention that sweet potatoes actually do not fare well in soils with high levels of organic matter. High levels of organic matter have been linked to root staining and some overall poor root quality such as long spindly roots.

SURCHLOR for Reduction of Onion Bacterial Bulb Rot in New York

Steve Beer, Cornell University & Christy Hoepting, CCE Cornell Vegetable Program

As recently announced, SURCHLOR, Surpass Chemicals' brand of sodium hypochlorite was registered by the NYS DEC **for application to growing onions to reduce bacterial rot in NY**. SURCHLOR was registered under FIFRA 24(c) as a Special Local Need (SLN) label. No other material registered by the EPA is available for the same purpose. Growers now have a tool to address one of their most challenging and costly problems, bacterial bulb rot, which routinely causes annual losses of 2% to 20%. **Crop Production Services (CPS) will distribute SURCHLOR**, which has outlets throughout the State; the product will be available shortly.

The registration was accomplished through collaboration in 2015 and 2016 among several commercial onion growers in NY and Research and Extension personnel at Cornell University. Onion growers added sodium hypochlorite to their routine insecticide and fungicide sprays for 4 to 8 weekly applications starting in late June. Just before harvest, the Research / Extension crew collected bulbs from plots that had been treated with sodium hypochlorite and comparable "check" plots that had not been sprayed with sodium hypochlorite. Each bulb was cut and examined closely for symptoms of bacterial rot and judged either rotten or not. Tests

continued on next page

were conducted in all the important onion-producing areas of NY, with emphasis on the Elba Muck region of Genesee and Orleans Counties and the Black Dirt region of Orange County. Summary data are presented in Fig. 1. There was less rot in most of the trial plots that had been treated with sodium hypochlorite, than in the “check” plots.

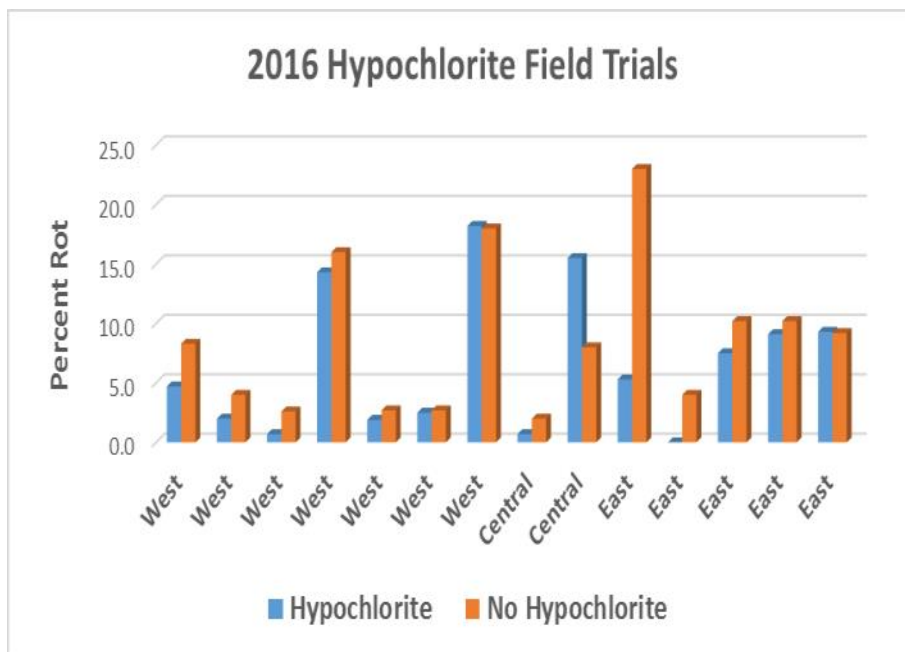


Fig. 1. Effect of hypochlorite (both sodium and potassium hypochlorite were trialed by growers across NY in 2016) on the incidence of bacterial bulb decay at harvest. Onion grower-cooperators added a hypochlorite product to their weekly tank mixes. Just before harvest, treated bulbs were compared to “check” bulbs that had been sprayed with the same tank mix without hypochlorite. In 10 of 14 side-by-side comparisons, the incidence of bacterial bulb rot was reduced in the onions had been treated with hypochlorite.

Sodium hypochlorite is a common sanitizer/disinfectant used to treat contaminated and municipal water, “shock” swimming pools, spas and hot tubs, sanitize hard surfaces, bleach laundry and paper pulp and treat sewage as a final step before releasing treated sewage into bodies of water. It is also used in dental root-canal therapy and poultry, meat, fruit and vegetable packing. However, the registration of SURCHLOR for application to growing onions is the first use of sodium hypochlorite for application to **GROWING** plants.

Based in part on our trial results, Surpass Chemical Co, a century-old chemical manufacturer based in Albany, applied to NYS DEC to register its brand of sodium hypochlorite for use on growing onions. **On May 15, 2017, NY DEC granted registration of SURCHLOR, active ingredient: sodium hypochlorite, for application to growing onions to reduce bacterial rot.** The SLN label is valid until December 31, 2022.

Precautions for Handling SURCHLOR 12.5% Sodium Hypochlorite

The concentrated 12.5% sodium hypochlorite, which is the active ingredient in SURCHLOR is labeled “DANGER”. It should be handled and used with due caution. At the least, when preparing the material for spraying, caution should be exercised. Protective clothing, including goggles and rubber or plastic gloves, should be worn. Bear in mind that sodium hypochlorite, bleaches clothing and contact with cotton clothing may cause holes.

According to the SLN label, SURCHLOR (12.5% sodium hypochlorite) may be added to grower spray tanks to achieve a final concentration of 1:1000 (v/v) (~ 1,200 ppm) in the spray tank (see Table 1). The spray tank may contain any materials (herbicides, insecticides or fungicides) registered for application to onions at that stage of growth. Sprays may be applied at a rate of 20 to 40 gallons per acre. Applications should be made every 7-10 days beginning in mid-June or at bulbing and ending when onions are 50% lodged.

Both the SURCHLOR SNL label (SLN No. SLN NY-170004) and the primary label (EPA No. 9359-2) must be in the possession of the applicator at the time of use. CPS will supply the labels, which are also available on-line. Go to <http://www.dec.ny.gov/nyspad/products>; on the right-hand side, under “Product Name” search for/type in “Surchlor”, then scroll down to click the “search” button. On the left-hand side, several products will appear: you will need the SLN and EPA No. 9359-2 labels. For each, click on the “more” button and from the screen that pops up, select the primary label of the most recent date.

Additional testing is underway during the present season.

Growers who wish to participate in trials in 2017 should contact their respective CCE associate right away. The program

will supply SURCHLOR needed for the trials as well as testing materials to monitor

hypochlorite concentration and pH of the spray.

Why more testing in 2017, given that the material is registered already? We need more data to determine factors affecting efficient use of SURCHLOR, namely concentration, spray schedule

| Gallons of Spray Mix in Spray Tank | Fluid Ounces of SUR-CHLOR to Add: | Milliliters of SURCHLOR To Add: |
|------------------------------------|-----------------------------------|---------------------------------|
| 20 | 2.56 fl oz | 76 ml |
| 30 | 3.9 fl oz | 113 ml |
| 40 | 5.12 fl oz | 151 ml |
| 50 | 6.4 fl oz | 189 ml |
| 75 | 9.6 fl oz | 284 ml |
| 100 | 12.8 fl oz | 378 ml |
| 150 | 19.2 fl oz | 567 ml |
| 200 | 25.6 fl oz | 756 ml |
| 500 | 64 fl oz | 1890 ml |

Table 1. Amount of SURCHLOR to add to tank mix to achieve 1:1000 (v/v) dilution.

and effect of SURCHLOR on other materials present in the spray tank. In addition to grower trials, we will be doing other trials to help determine optimum efficiency. We also hope to get clues as to when bacterial rot is initiated during the growing season.

WPS & Respirator Compliance

Marie Ulrich, ENYCHP

Through the flurry of new Worker Protection Standard information and regulations this spring, I have found myself relying on a couple of websites repeatedly. One is the Pesticide Education Resource Collaborative. The site has most of the training materials you will need for WPS compliance as well as others. They can be found at: <http://www.pesticideresources.org/>. Also, because referring to the source is important, the EPA website on WPS is also useful. It's where you can find the current "How to Comply" manual and many other items such as a comparison chart of new and old regulations. If you would like to purchase a 2017 (2015 rule changes) WPS Manual, CCE Orange has them for \$12.

You may also have missed out on the respirator fit tests clinics this winter spring and still may need to have them completed. You must have a physical exam prior to the fit test. Medical personnel use this for evaluation: https://www.osha.gov/pls/oshaweb/owadis.show_document?p_table=standards&p_id=9783.

Then for the actual fit test/training, you can call NYCAMH: <http://www.nycamh.org/> or find and independent OSHA evaluator. Many medical facilities that do CDL testing also do respirator fit tests and you can use one of those. In the Hudson Valley, there is First Care in Highland <http://www.firstcaremedcenter.com/>. However, before you schedule your appointment, make sure the means with which they test the respirator fit is compatible with the type of respirator you use. Many other industries have respirator standards that these companies accommodate but ½ face respirators used on farms tend to be many brands and styles which all may not be compatible with the equipment available to a particular evaluator.

Also, feel free to call me (845-344-1234) if you have any question about compliance. Many agencies that might visit your farm are encouraged to ensure that these new regulations are being followed.