Cornell Cooperative Extension | Cornell Vegetable Program

VEGEdge

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Late Blight Confirmed in Western NY – Be On the Lookout!

Elizabeth Buck and Margie Lund, Cornell Cooperative Extension, Cornell Vegetable Program

In the past week, late blight has been confirmed on tomatoes and potatoes in Cattaraugus and Wyoming counties in New York State. The disease was found in both high tunnels and in field settings. Samples have been submitted for strain identification, but no ID has been made at this time. The past few years late blight in the area has been US-23 which is susceptible to mefanoxam (Ridomil). **Late blight is a regional disease that moves on air currents and rain storms.** If you have late blight, it will generate millions of spores very quickly. **Anytime your crop is sporulating, late blight can spread on your farm and to other farms.**

In all instances reported to date, the disease was found throughout the field and was sporulating. In some cases the disease was aggressive. Recent pop-up storm systems that have moved through the region have increased the likelihood that spores could have been carried to neighboring counties. Growers in nearby counties should be scouting their tomato and potato fields regularly. Attention should be given especially to parts of the fields that exhibit high humidity, such as low lying areas, along hedge rows, near weedy patches, and near water. **Potatoes should be monitored until mature, at which time kill vines to protect tubers in the ground, and make sure vines are completely dried and dead before harvesting tubers.** Know when to quit on tomatoes. Late blight directly infects fruit so there is little reason to try to keep a planting alive once the disease gets the upper hand. Your marketable fruit count will be low and your costs of production very high. **Tomato plants should be killed rapidly** (loppers at soil line works in small staked plantings) **and incorporated into the soil as soon as you abandon a field** due to late blight or finish harvest. Good weed control is also important to increase air flow and reduce moisture throughout fields. **Stay on top of spray schedules** and be prepared to address late blight should it arrive in your fields.

Late blight is difficult to stop once it is established in a canopy and is best treated quickly. Once 5% of the plants show any signs of the disease, the odds of regaining control drop rapidly. In a tomato field observed 7/18, **a susceptible variety had 100% of the plants infected and 30% of the canopy dead within 10 days of infection.** Effective fungicide was applied two days after first symptom development but late blight had already gained a foothold and with the rainy weather the control failed. **Do not hesitate once you see late blight, be on top of treatment.** Genetic resistance is available in certain tomato varieties and works. It is not available in potato. A resistant variety next to the devastated tomatoes had only minor levels of disease, was not generating spores, and was holding up well with the use of effective fungicides.

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About VegEdge

VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 counties.

The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

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Systemic fungicides can be expected to provide high levels of control, as long as the late blight strain present is not resistant. The **next best choices are translaminar fungicides that can penetrate the leaf.** Contact products work primarily on the leaf surface and will not kill the organism inside the leaf. Protectants work best before late blight arrives and are important tank-mix partners for many of the above materials.

Examples of effective chemistries include Ridomil, Gavel, Ranman, Orondis, Revus, Zing, and Zampro. See Table 1 (next page) for more information. Many group 11 fungicides have late blight on the label but they do not consistently achieve satisfactory control and should only be used alongside another effective material once disease is present. Consult pesticide labels for specific rates for potato and tomato and consult the Cornell Vegetable Guidelines for other labeled fungicide options for tomato and potato. **Important for tunnel growers!** New regulations in NY specify that **you may only use a product inside a greenhouse or high tunnel if that label has specific greenhouse use instructions.** This is a major change from the previous regulation governing greenhouses and high tunnels. Contact your local veg specialist for more information on products allowed for use in tunnels.

For organic operations, copper is both the protectant and the most effective treatment. Most organic fungicides with late blight labels only burn off spores and do not effectively treat the disease inside the leaf. Since the late blight is still alive inside the leaf, the lesions will continue to grow and can produce new spores each day.

Because some strains of late blight are not sensitive to all fungicides, it is important to submit samples to the lab so that genotype can be identified. Therefore, **if you suspect you have late blight in your field, contact a local CCE specialist** so that samples can be submitted and management decisions made in a timely manner. Contacting us allows us to give others advance warning and helps you get the most recent management advice. We only report disease presence by county, no farms are identified.

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When rotating fungicides ***pick a product with completely different FRAC group(s). Systemic activity > translaminar > contact. Protectants do not effectively treat infected tissue****, they protect healthy tissue from disease.* ***Group 11 products really struggle to control late blight;*** *use only as back-up, not primary control.*

Table 1. Common Fungicides Used for Late Blight (LB) Control in Tomato and Select Other Uses

Name	FRAC Group	Activity Type	REI hr	PHI day Tom	Tomato Rate/A	Tomato Rate/1000 ft²	Potato LB**	PHI day Pot**	P.cap Uses?**	Cuke Downy**	Other Tomato Diseases**^
Orondis Opti	49 + M5	Systemic + protectant	12	0	1.75 - 2.5 pt	0.77 - 1.10 fl oz	Y	7	Y	Y	none
Orondis Ultra	49 + 40	Systemic + translaminar	4	1	5.5 - 8 fl oz	0.13 - 0.18 fl oz	Y	14	Y	Y	none
Champ 2F or OLP	M1	Protectant	48	0	1.3 pt	0.48 fl oz	Y	0	Y	Y	EB, AN, S, BO
Kocide 3000-O	M1	Protectant	48	0	0.75 - 1.5 lb	0.28 - 0.55 oz	Y	0	NA	Y	EB, AN, S, BO
***ManKocide**	M1 + M3	Protectant	48	5	1-3 lb	0.37 - 1.1 oz	Y	3	pepper	Y	EB, AN, S, BO
Bravo Weather Stik	M5	Protectant	12	0	1.375 - 2.75 pt	0.51 - 1 fl oz	Y	7	NA	Y	EB, AN, S, BO
Catamaran	P07 + M5	Contact + protectant	12	0	5 - 7 pt	1.8 - 2.57 fl oz	Y	7	N	Y	EB, AN, S, BO
Prophyt or OLP	P07	Contact	4	0	4 pt	1.47 fl oz	Y	0	Y	Y	none
Ridomil Gold Bravo	4 + M5	Systemic + protectant. **Works on LB strain US-23.**	48	7	2.5 pt	0.92 oz	Y	14	Y, Resist	Y, Resist	none
Ranman 400 SC	21	Contact	12	0	2.1 - 2.75 fl oz	0.048 - 0.063 fl oz	Y	7	Y	Y	none
***Zoxium**	22	Contact	48	5	2.5 - 4 oz	0.057 - 0.092 oz	Y	3	N	N	none
***Gavel 75 DF**	22 + M3	Contact + protectant	48	5	1.5 - 2 lb	0.55 - 0.73 oz	Y	3	Y	Y	EB, S
***Zing!**	22 + M5	Contact + protectant	12	5	36 fl oz	0.826 fl oz	Y	7	N	Y	EB, S
Tanos 50 DF	27 + 11	Translaminar	12	3	8 oz	0.18 oz	Y	14	Y	Y, Resist	EB, AN, S, BO
Cymbol Advance	27 + M5	Translaminar + protectant	12	3	1.9 - 3 pt	0.7 - 1.1 fl oz	Y	14	N	Y, Resist	none
***Cymbol Balance**	27 + 28	Translaminar + systemic	12	5	21 fl oz	0.48 fl oz	N	14	N	Y, Resist	none
***Previcur Flex**	28	Systemic + protectant	12	5	0.7 - 1.5 pt	0.26 - 0.55 fl oz	Y	14	N	Y, Resist	EB
Revus Top	40 + 3	Translaminar. Grp 3 no LB activity.	12	1	5.5 - 7 fl oz	0.13 - 0.16 fl oz	Y	14	N	N	EB, AN, S
Forum	40	Translaminar	12	4	6.0 fl oz	0.138 fl oz	Y	4	Y	Y, Resist	none
***Zampro**	40 + 45	Systemic + translaminar	12	4	14 fl oz	0.32 fl oz	Y	4	Y	Y	none
***Presidio**	43	Systemic	12	2	3 - 4 fl oz	0.068 - 0.092 fl oz	N	--	Y	Y, Resist	none
Cabrio	11	Translaminar. Weak on LB.	12	0	8 - 16 oz	0.18 - 0.36 oz	N	--	NA	Y, Resist	EB, AN, S, BO
Quadris Flowable or OLP (Opti rate diff.)	11	Translaminar. Weak on LB. Quadris Top is NOT labeled.	4	0	6.2 fl oz	0.14 fl oz	Y	14	NA	Y, Resist	EB, AN, S
Flint (Potato=Flint Extra. Diff. rate for Flint Extra on tomato.)	11	Translaminar. Weak on LB.	12	3	4 oz	0.092 oz	Y	7	NA	Y, Resist	EB, AN, S
***Reason 500 SC**	11	Translaminar. Weak on LB.	12	14	5.5 - 8.2 fl oz	0.13 - 0.18 fl oz	Y	14	NA	Y, Resist	EB, S
***Priaxor**	11 + 7	Translaminar. Grp 7 no LB activity.	12	0	8 fl oz	0.18 fl oz	Y	7	NA	N	AN, S

* Restricted-use pesticide.
** See label for rate, PHI and instructions.
^ LB: late blight; EB: early blight; AN: anthracnose; S: septoria; BO: botrytis in open fields.
Conversions for small plantings: 1 fl oz = 2 Tbsp or 6 tsp or 29.57 mL. 1 tsp = 0.167 fl oz or 4.93 mL. **Do NOT use pesticide measuring devices for any other purpose. Always read and follow the label. The label is the Law. Labels change frequently and human errors are possible.**

CROP Insights

Observations from the Field and Research-Based Recommendations

BEETS

Harvest of the 2025 crop is well underway for both fresh market and processing. Disease detection and management is important for the remainder of the season with harvest going well into the fall. Cercospora leaf spot (CLS) is the most common and typically appears from mid-to late July onward. Symptoms are initially small, necrotic lesions surrounded by a red to purple margin in a red table beet cultivar. In a yellow cultivar, the margins of lesions are tan. CLS lesions have a tan to gray center on all cultivars. When the lesions are observed through a hand lens, tiny black pinpoint-like structures called pseudostromata are visible carrying spores called conidia. Lesions eventually coalesce and cause defoliation. The disease spreads where there is high humidity and leaf wetness. For more information and photos of CLS and other beet diseases see https://www.vegetables.cornell.edu/crops/beets/ – JK

CARROTS

The crop should be monitored for potential leaf diseases for the remainder of the season. Bacterial lesions are small yellow areas on the leaflets with brown, dry centers often surrounded by a yellow halo. Copper is labeled for bacterial leaf blight. Cercospora leaf spot, caused by the fungus *Cercospora carotae*, is prevalent during hot and humid weather. Cercospora lesions are small, circular, tan, or gray spots with a dead center which appear along the leaf margins causing them to curl. The Cercospora fungus attacks younger leaves. Alternaria leaf blight caused by the fungus *Alternaria dauci*, first appears as deep brown to black irregular spots on the margins of the leaflets. Lesions on petioles and stems are deep brown and girdle the stems, killing them. As the disease progresses, entire leaflets may shrivel and die. Lesions are more prevalent in older foliage. Powdery mildew may also develop in carrots. There are several fungicides labeled for carrots as outlined in the 2025 Cornell Vegetable Guidelines. Choices should be based on which disease(s) you are trying to control, cost, and PHI. – JK

CANTALOUPE

Alternaria should be a management target this week.

CUCUMBERS

Seeing a lot of foliar disease in high tunnels. Remember that you **cannot** use Bravo inside. Copper is the preventative option for tunnels. Outdoors seeing plants beginning to go down with bacterial wilt. Classic symptoms are a progression from soft floppy leaf to pale green collapse to partially crispy leaf to brown crunchy leaf that gets worse as you trace a vine from new growth back toward the crown. Bacterial wilt was transmitted by the cuke beetles several weeks ago. It takes time for the bacteria to build up and clog the veins, but once they do there is no cure. Manage 2nd generation cuke beetles (they're nearly here) to prevent further spread. Removing infected plants works when there aren't too many to be impractical. Mow off first planting as they finish to further reduce transmission risk.

Angular bacterial leaf spot is other issue I'm seeing in far WNY. Angular can cause yellow and crisping Vs centered over a vein and wider at the leaf edge and more narrow as it moves inward. More often though I'm seeing blocky spots distributed over leaves. These blocky lesions have white centers and have a strong white halo when held up to the light. They will cross veins and they might tear out with age, giving the leaf a "shot hole" appearance. This is different from downy mildew, which causes blocky yellow checkers, has no white, doesn't cross veins, and has fuzzy gray spores on the underside when left in a sealed bag on the counter overnight.

If you see downy, please do us a favor and send us a picture or give us a call. We try to keep track of it and give folks advanced notice of when they're at higher risk. It helps save folks' crops once it shows up. If we know we'll get notified about its arrival, then we can be confident that we're able to make accurate risk assessments and help folks avoid crop loss and also avoid making applications of specialized fungicides when risk is low. – EB

DRY BEANS

Western bean cutworm trapping continues this week at 15 fields in locations in the region (Table 1). Overall, numbers are lower this year than previous years, but are starting to pick up in many locations this week.

Table 1. Western bean cutworm adult moth numbers by date for each dry bean trap location.

Dry Bean Location	July 1	July 8	July 15	July 22	Cumulative Moths
Attica (Wyoming Co.)	0	0	10	21	**31**
Avoca Valley (Steuben Co.)	-	0	0	6	**6**
Avoca Hill (Stueben Co.)	-	0	1	32	**33**
Caledonia 1 (Genesee Co.)	1	0	0	22	**23**
Caledonia 2 (Genesee Co.)	0	0	0	35	**35**
Churchville 1 (Monroe Co.)	1	0	10	112	**123**
Churchville 2 (Monroe Co.)	0	1	2	27	**30**
LeRoy 1 (Genesee Co.)	0	0	0	7	**7**
LeRoy 2 (Genesee Co.)	0	0	1	2	**3**
Pavilion (Wyoming Co.)	-	0	0	16	**16**
Penfield (Monroe Co.)	-	-	0	25	**25**
Geneva 1 (Ontario Co.)	0	0	3	33	**36**
Geneva 2 (Ontario Co.)	-	2	9	47	**58**
Wayland Valley (Steuben Co.)	-	0	2	17	**19**
Wayland Hill (Steuben Co.)	0	2	1	30	**33**

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Leaf hoppers are moving into dry bean fields. In Cruiser Leaf hopper adults are present in many dry bean fields. In Cruiser treated fields, an insecticide before bloom is rarely needed, and the presence of nymphs indicates that Cruiser is no longer working. Mexican bean beetle adults and larvae are present in some fields. Monitor fields for increased numbers and damage. Many of the early planted fields are now in or entering bloom stage, so white mold management should now be considered. An initial application of Omega 500F is recommended followed by a second application of Endura 70 WDG. The first application should be made at the early bloom stage. – ML

GARLIC

Harvest is progressing. A lot of plantings are losing canopy from the top because of suspected Stemphylium infection. This reduces the amount of resources the garlic can pull down from the leaves.

ONIONS

We just had our third hot and dry week during onion bulbing. Most direct seeded fields have 1 to 1.5" bulbs and tipburn is just beginning and are riding the "momentum of Movento" as onion thrips counts remain below the spray threshold (< 1.0 thrips/leaf) following the double-application of Movento. In the Elba muck in several fields, thrips counts jumped from < 1.0 thrips/leaf to 3-5 thrips/leaf, appearing as if they dropped out of the sky. This scale of increase is from an influx from outside of the onion field, and not just from natural reproduction within the onion field. All growers in Elba will be spraying the same "hammer" insecticide treatment in majority of onion acreage this week – I'm so excited to see the devastation to the thrips next week. Thrips are also crawling up and down the leaves of the plants, thus, when scouting you need to look for thrips all over the leaves and not just in the leaf axils, which is much more time-consuming, but also accurate. In plants that are no longer putting on new leaves, the thrips will surely not be in the leaf axils. With the hot temperatures and lack of rainfall, fields that cannot be irrigated were showing signs of water stress this week including outer leaf dieback, increased tipburn and lack of vigor. We are wishing for a "bulb" rain this week. – CH

The good news is that leaf diseases Botrytis leaf blight (BLB) and Stemphylium leaf blight (SLB) are at the lowest levels that I have seen in years (I can't even remember when…). BLB necrotic spots are expected to increase gradually despite fungicide use for the duration of the growing season, because they prefer aging plant tissue. Growers are in the middle of their fungicide spray programs and need to make decisions about how much Bravo and FRAC P07 fungicides to use, because in 2024 on-farm onion fungicide trial, too much Bravo resulted in a yield drag, and that the more FRAC P07 fungicide that could be used in a seasonal fungicide spray program, the better. We are recommending striving for no more than 10-12 pt/A of Bravo and no more than 5 applications of FRAC P07 fungicides, including 4 applications during the last 4 weeks – see article on page 8. Although this is what I am striving for, I will be slightly exceeding these limits in my fungicide programs. – CH

Fresh Market Onions

Thrips are getting after fresh market plantings. Don't ignore these. You don't want them stripping the green out of your crop and limiting bulb size. Plus, their feeding increases the risk of rot. We don't see the same pressure they do in the muck but we do need to manage them once or twice a season. Don't be slack in this arena, hit them before pressure builds. As I learned last week, a single thrips can give rise to over 60 offspring and doesn't even need to mate to do so. Pyrethroids don't work well at all. Radiant or Entrust are decent materials that many fresh market growers have on hand.

As always, Candy onions rot. Opening up the plastic helps to reduce incidence and severity of sour skin, the rot on the outside of the bulb. The onion bulbs don't like it that hot and moist as they get pushed up against the plastic. The bacteria love it. Plants showing center rot can be pulled and sold early so long as the rot is in the upper portion of the leaf. Once symptoms reach the lower portion of the leaf (and definitely once it reaches the neck) the rot could already be below where you'll trim and the bulb could rot. Rot spreads on trimming tools! Don't introduce bacteria into healthy bulbs during market prep. Pull the sketchy ones separately and trim them last, then disinfect your tools. – EB

PEAS

Harvest crews for the processing crop have been working to finish up the harvest. There was a bit of a lull early this week because of gaps caused by weather issues. Much of the crop was treated with fungicide for downy mildew this season. No other major issues other than needing to work around the weather this year – a wet May created planting issues and some of the crop went in on ground that was too wet and compacted. Hot temperatures in June and July, coupled with lack of rain in some areas in July stressed pea plants. – JK

POTATOES

Late blight has been confirmed in New York in the past week in potato and tomato in Cattaraugus County and in potato in Wyoming County. If you suspect you have late blight on your farm please contact CVP Specialist Margie Lund or Elizabeth Buck to come collect a sample for strain identification. Late blight infected leaf tissue will initially appear water-soaked and become brown or black within a few days. Lesions are often surrounded by a halo of light green tissue. Under high humidity, sporulation is visible as a white mold primarily along the lesion edge on the lower leaf surface. Stems and growing points of the plants may also become infected and turn brown. For more information consult this week's cover article.

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Figure 1. Late blight lesion on a potato leaf (left) and growing point (right). *Photos from ONvegetables and Ontario CropIPM*

Colorado potato beetle larvae are still active in many potato fields this week. If thresholds of 200 small larvae or 75 large larvae per 50 plants are exceeded, an insecticide application is recommended. Potato leafhopper adults are also present in low numbers. Treatment is recommended when 15 nymphs are found on 50 plants. – ML

SNAP BEANS

Harvest of the processing crop is underway. Continue scouting for potato leafhoppers. Japanese beetles and Mexican bean beetles can defoliate fresh market beans. These beetles are not a major problem for processing snap beans but could be for organic production. - JK

TOMATOES

There is late blight in WNY. As of Tuesday night, it has been confirmed on multiple farms in Cattaraugus County. It is fully expected to show up elsewhere in short order. It is aggressive, fully enjoying the ample (excessive?) rain in that region. Farms with resistant varieties are seeing a huge benefit and are able to hold it in check while struggling with or losing susceptible varieties. It is also showing up inside (you can't use chlorothalonil in a tunnel). We're beyond simple protectants, apply a late blight effective material this week. Organic that's copper. Conventional many, many options. See Potato section and cover article. – EB

We previously reported on outbreaks of Bacterial Speck on fresh market, slicing varieties of tomatoes this summer. Consultations with Cornell Plant Breeder Greg Vogel and Pathologist Chris Smart indicate that a race of the bacterial pathogen (*Pseudomonas syringae*) may be overcoming resistance bred into Roma or saladette varieties. We recommended growers with varieties listed as 'resistant' to bacterial speck scout for symptoms: small black specks on leaf surface and margins, as well as distinct raised black specks on fruit. See the July 9, 2025 issue for photos. Growers are advised to consider preventative spray programs even on resistant varieties as we learn more about this race. As a reminder, copper products are the best option for both organic and conventional growers; further conventional materials include mancozeb and Gavel. Mulching between rows reduces rain and soil splashing into the canopy, which is a common way for the disease to spread. – JR

Seeing canker starting up. Aggressive management with rogueing is necessary for canker. Early blight is present, too. – EB

WATERMELONS

Unfortunately, some growers in our region have experienced severe hailstorms recently. In some cases, such as later pumpkins and late planting of watermelons and cantaloupes, damage to fruit was not severe. Defoliated plants that have a healthy root system can grow back a new canopy surprisingly quickly. In these cases, a standard disease management program, and adequate irrigation and fertility could get the crop close to on-track. However, watermelons (and cantaloupes) that had fruit with hail injury (Fig. 2) are likely not worth saving. The plant could grow new leaves and set new fruit, however the injured fruit is likely to rot and contaminate new fruit, and simply be an unworkable mess. These planting can be tilled under, and a cover crop such as buckwheat (July) or tillage radishes (mid August) sown. There are several short-season vegetable options too, such as radishes, beans and lettuce. Zuchinni and Summer Squash are also possibilites, but bear in mind pests and diseases from the now tilled under vine crops will put pressure on these crops.

Figure 2. Severe hail damage like this means the crop is beyond saving. Fruit in this condition will likely rot and contaminate the rest of the planting. There are several options of vegetable and cover crops that could be planted in this space once the watermelons are plowed under. *Photo: J. Reid, CCE*

Managing the Trade-offs of Overhead Irrigating at Night

Elizabeth Buck, Cornell Cooperative Extension, Cornell Vegetable Program

While many areas are overly wet this summer, there is a strip along Lake Erie and Ontario that has been quite dry. Many farms have been irrigating for weeks with little breaks and some streams are starting to run low. Very hot weather often necessitates irrigating overhead through the night, when less evaporates or gets blown off-target. This does promote disease and I've taken a number of calls where that's happened so far this July. Night irrigation has so far kicked up white mold in brassicas, holcus bacterial leaf spot in corn, and aggravated bacterial infections in cucurbits.

I get it. This is a tough spot. Of course, night irrigation is going to happen, but there are things you can do to reduce your disease side-effects. Crop risk changes based crop stage, airflow in the field (hedgerows and field orientation to breezes), field history of disease, time of year, night temperature, forecast for the next day, and time of irrigation. Let's walk through some examples.

Crop Stage

Corn ear fill is sensitive to drought and heat stress during silking and through pollination. Pollen viability drops when temperatures approach or exceed 90 degrees. Low humidity and high temperatures can also delay or damage silk development. In really hot weather, it makes sense to put water on corn in this sensitive stage during the day to take advantage of the cooling effects.

In normal conditions (highs in mid-80s) you can often water corn at night. This is a fine practice until tar spot begins to appear. The wet overnight conditions during the cooler night temperatures make tar spot very happy. It is also a fine practice unless you're seeing holcus bacterial leaf spot (see photo in crop notes). In those cases, prioritize watering corn closer to harvest during the day. Younger corn can more easily be treated with fungicides to control disease without getting into PHI issues. It also has a smaller canopy and will dry out faster than a larger field.

Overall Disease Pressure

Potatoes benefit from irrigation and some folks water them at night. Now that there is late blight flying around, night irrigation of potatoes is a risky move and should be avoided. Late blight is vicious when there are hours of canopy dampness. Similarly, if the next planting over has a disease that is spread by soil splash, then you've got elevated disease pressure. This also holds true if you've got a disease hot spot in the field. Nothing spreads bacteria as efficiently as overhead irrigation at night. Especially if the reel gun is traveling right through the center of that hot spot.

Time of Year

Right now is a prime window for gummy stem blight. Gummy turns into black rot. Not a great time to be watering susceptible fall squashes overnight. Later in the season, like late August into September, fall squashes also face anthracnose and other fruit rots with wet nights. Late July through early August is a lower risk period for fruit rotting diseases and so a lower risk time for night irrigation (assuming you kept gummy out). Yes, there is powdery mildew present then, but powdery is far easier to deal with than fruit rots.

Field History

White mold attacks most vegetables but can be particularly foul on cabbages and other cole crops. July isn't typical timing. White mold is more a late summer disease because it needs wetter, dewy nights and cooler temperatures, which late August usually provides. If you have a field history of white mold, you're almost guaranteed to see issues in a brassica crop (and beans) if the environmental conditions are favorable for disease development. July should be safe, but overhead night irrigation and bad luck are definitely causing problems out there. Excessive rain gets the same job done, which is why I'm also seeing it in staked tomato in regions receiving too much rainfall.

Field Orientation

Fields oriented parallel to the prevailing breeze dry out faster than fields oriented perpendicular, particularly for tall crops like corn or staked tomato. You can water closer to nightfall on a breezy day knowing that the air flows through the field better.

Time of Night Irrigation

If you have a field with higher risk factors for disease but need to water it at night, try to schedule it to receive water as late as possible. The closer to dawn the water goes on, the fewer hours the canopy will be damp and favorable for disease. If you plan to water two fields that night, one at 8pm and one at midnight, consider choosing the high risk field for midnight to reduce the hours of leaf wetness. Better yet, consider whether you can delay the midnight watering until closer to dawn.

Ability to Treat Disease, Efficacy of Treatment, Cost of Treatment, and Time to Treat

"I'll deal with the disease later" is a valid approach that works well for many growers. Just remember to look pragmatically at the business and labor management side of that decision.

Do you have time or available labor to scout the field and stay on top of spraying? How long will you have to deal with the disease? One app because it isn't too bad and you're close to harvest or 4 apps because it is a late catch and you've got over a month to go?

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How much do the effective fungicides cost? Do you have the rotation chemistries, because a lot of things can only be used twice before rotating to another effective mode of action. Can you recoup the cost of added disease management in your market price? Alternatively, can you afford to take a yield hit if you lose a certain percentage of the crop to disease? You may not reach your economic treatment threshold, especially if you're very close to harvest. Just be sure to set yourself up for financial success.

Do you have ready access to the materials that are most effective? Are there cost, philosophical, or sourcing reasons that you can't/don't feel comfortable using those controls?

Can this disease be managed well with spraying? Bacterial infections can be very difficult to regain control over. White mold in beans, late blight, aggressive pepper anthracnose, alternaria in broccoli and onion Stemphylium can all become costly battles that you might not win.

Practice Scenario

You've got three fields of cabbage and you have to irrigate at night, no other choice. The plantings are 3 weeks apart in age. The middle field has a black rot hot spot along the hedgerow on the western side of the field and another in the middle of the planting where the irrigation travels. Another field is 7 days out from harvest. The youngest planting is in a field with good airflow and a history of white mold. What would you do to reduce risk? What order do you water them in?

==> Watch for answer(s) to this scenario in next week's VegEdge! ●

Plan Ahead: How Much Bravo and FRAC P07 Fungicides Do You Want to Use for Managing BLB and SLB in Onion?

Christy Hoepting, CCE Cornell Vegetable Program, and Frank Hay, Dept. of Plant Pathology, Cornell AgriTech

The results from the 2024 on-farm onion (c.v. Bradley) fungicide trial for Botrytis leaf blight (BLB) and Stemphylium leaf blight (SLB) in Elba showed a yield drag in treatments with Bravo despite very good plant health/green foliage, and that the more FRAC P07 fungicide that could be used in a seasonal fungicide spray program, the better. But what is the risk of SLB developing fungicide resistance to FRAC P07? As many muck onion growers are in the middle of their fungicide spray programs, they need to decide how much Bravo and FRAC P07 fungicide they want to use and plan the rest of their fungicide spray program accordingly to not exceed their desired maximum use rates.

Too much Bravo may result in yield drag

- In 2024 on-farm onion fungicide trial, tank mix treatments with Bravo yielded significantly less than the highest and second-highest yielding treatments, despite having the greenest or second-greenest foliage at the end of the trial (Figure 1).
  - Specifically, Viathon 3 pt/A + Tilt 8 fl oz/A + Bravo 3 pt/A (V + T + B) had significantly 1.5-times greener foliage and significantly **6.5%** (= 49 cwt/A) lower yield than V + T.
  - In this trial, treatments were applied for 7 consecutive weeks. Thus, treatments with Bravo 3 pt/A received a total of 21 pt/A of Bravo, which is 1 pt over the labeled maximum use per season rate.
  - Muck onion growers in Elba and Wayne & Oswego averaged a total of 9 pt/A and 7.5 pt/A, respectively, with a range of 1.5 pt/A to 14.5 pt/A of Bravo in their 2024 fungicide spray programs – Much less than amount used in the trial.
- In a study in Florida using 'Texas Early Grano 506' onion variety, 10 consecutive applications of Bravo 2 pt (= total 20 pt) and 5 bi-weekly applications of Bravo 2 pt (= total 10 pt) significantly reduced bulb weight by **44%** and **27%**, respectively (Stoffella and Sonata, 1982) - Much more than the yield reductions in 2024 Elba trial.
- When I first started in CCE 25 years ago, it was apparently common knowledge that too much Bravo may reduce bulb size and yield. I was never clear on whether this was based on anecdotal evidence or research results.
- In my field trials, the Bravo treatments tended not to yield well but also did not have very healthy foliage to yield well.
- Since onion foliage was healthy in the treatments with Bravo in the 2024 trial, this was the first time that my trials showed a yield drag with **Bravo (21 pt total reduced yield by 6.5%)**.
- Bravo has very good activity on BLB halo lesions, is good on BLB necrotic spots and even has some minor activity on SLB sporulation on necrotic leaf tissue. It is an **excellent tank mix partner** (except with Movento) **that enhances overall disease control in onion, and it would be great if it could be used as much as possible in a seasonal fungicide spray program. But how much Bravo is too much?**
- Based on our research results and those from Florida, we decided to **recommend that growers strive for no more than 10-12 pt/A of Bravo, if possible, to avoid yield drag.**

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The more FRAC P07 fungicide, the better (Table 1)

- In the 2024 on-farm onion fungicide trial, **green foliage increased approximately 10% for every 2 additional applications, which also started earlier in the season of FRAC P07 fungicide in a 7-week fungicide program** (green foliage: 3 apps: 32%; 5 apps: 41%; 7 apps: 51%).
  - The program with 7 applications of FRAC P07 fungicides had significantly greener foliage and fewer plants with 3 or more SLB target spots/plant than the program with only 3 applications of FRAC P07 fungicides. The program with 5 applications of FRAC P07 fungicides was not significantly different than either of these programs for either of these variables.
  - There were no significant differences between programs with 3, 5 or 7 applications of FRAC P07 fungicides for BLB necrotic spots, SLB sporulation on necrotic leaf tissue or yield, although there was a general numerical trend that more FRAC P07 was better.
- Based on these results, **we recommended for 2025 onion growing season, to at least use FRAC P07 for the final 4 fungicide applications**, because 3 applications were not enough. Five applications were adequate, but 7 applications were better.
- The unknown is the risk of SLB developing fungicide resistance to FRAC P07, and whether using 5-7 applications of FRAC P07 is too risky.

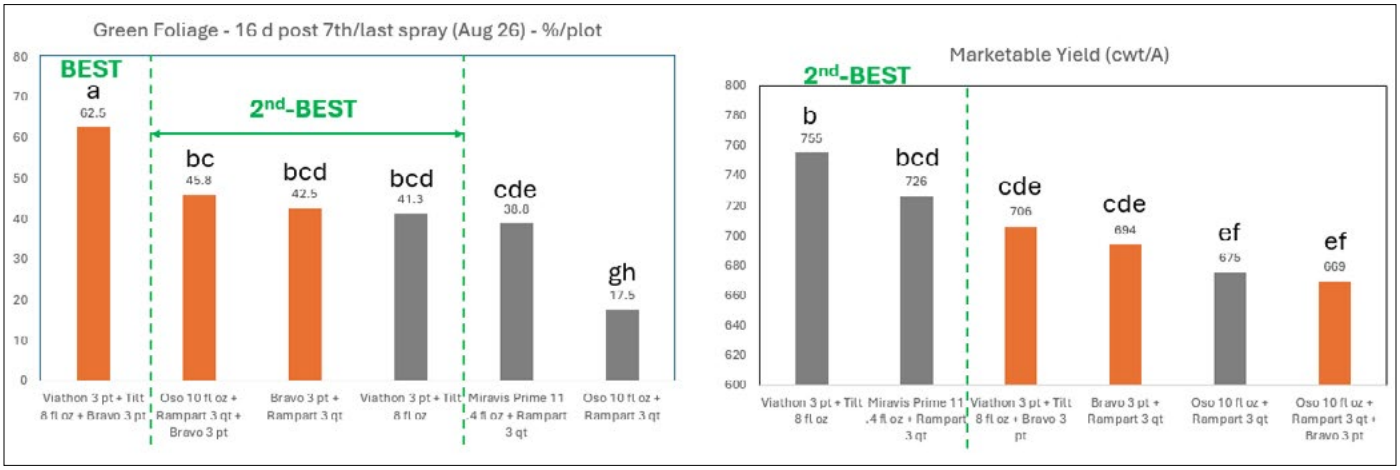

Figure 1. Results from 2024 on-farm onion (c.v. Bradley) fungicide trial, Elba, (Hoepting *et. al*): Plant health/green foliage compared to yield for tank mixes with Bravo (**in orange**) and without (**gray**). These are the results after each treatment was sprayed for 7 consecutive weeks, starting at early bulb swell until 50% lodging. Columns with the same letter are not significantly different, Fisher's Protected LSD test, $p < 0.05$. Note, analysis conducted on several treatments, not all of which are included in these graphs.

Table 1. Results from 2024 on-farm onion (c.v. Bradley) fungicide trial, Elba, (Hoepting et. al): Fungicide programs (7 weekly sprays) with 3, 5 and 7 applications of **FRAC P07 fungicide.**

	5 d post 4th spray (Jul 25)	5 d post 6th spray (Aug 8)		16 d post 7th/last spray (Aug 26)	Harvest (Oct 12)
Fungicide Program No. of FRAC P07 fungicide applications	**SLB target spots ≥ 3/plant (% of plants)**	**BLB necrotic spots No./leaf**	**SLB sporulation on necrotic leaf tissue Mean Severity Rating 0-6[1]/plant**	**Green Foliage (%/plot)**	**Marketable Yield (cwt/A)**
Nontreated	65.3 ab[2]	125.3 a	4.58 a	0.5 g	613 f
3 apps: Start 1.5-2" bulbs, 15% tipburn	**0 apps:** 54.2 ab	**1 app:** 30.9 b-f	**1 app:** 3.62 abc	32.5 d	678 cde
5 apps: Start 1" bulbs, tipburn starts	**2 apps:** 40.3 bcd	**4 apps:** 27.2 efg	**4 apps:** 3.42 bc	41.3 cd	667 def
7 apps: Start 7-leaf, early bulb swell	**4 apps:** 27.8 c-f	**6 apps:** 23.1 d-g	**6 apps:** 3.54 bc	51.3 b	693 cde

1 SLB sporulation on necrotic leaf tissue severity scale: 0 = No SLB; 1 = < 25% tan-colored sporulation; 2 = 25-50% tan sporulation; 3 = > 50% tan sporulation; 4 = < 25% black sporulation; 5 = 25-50% black sporulation; 6 = > 50% black sporulation. Black sporulation is considered primary.

2 Numbers in a columns with the same letter are not significantly different, Fisher's Protected LSD test, $p < 0.05$. Note, analysis conducted on several treatments, not all of which are included in this table.

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Risk of SLB developing fungicide resistance to FRAC P07 fungicides

- The active ingredients in FRAC P07 are phosphonates and include mono-and di-potassium salts of phosphorous acid in Rampart and potassium phosphite in Reveille and Viathon.
- Phosphonate is systemic in plants and can move both upwards in the plant through the xylem and downwards in the phloem. It is long-lived in plants and short-lived in the environment.
- Phosphonate has been used in disease management for 4 decades, mostly for oomycetes pathogens (= water loving molds such as Phythopthora and Pythium species and downy mildews), but also for bacteria and true fungi.
- Most of the research on the mode of action and fungicide resistance of phosphonate has been done on oomycetes, which are not true fungi like BLB and SLB. More research is needed to confirm similar behavior in true fungi.
- In oomycetes, **phosphonate has two modes of action:** 1) direct fungicidal activity on mycelial growth and spore formation, where disease control increases as rate applied/plant tissue concentration increases. 2) stimulates plant host defenses, which often works best when phosphonate is applied prior to disease onset or under low disease pressure, and at lower rates (known as "priming"). Multiple and complex pathways are involved in this mode of action.
- Thus, the **Fungicide Resistance Action Committee (FRAC) rated FRAC P07 to be at low risk of fungicide resistance development.**
- The use of plant resistant activators as a strategy for disease management is frequently inconsistent under field conditions due to plant resistance being influenced by the environment, variety, crop nutrition, disease pressure, extent to which plant defenses are already naturally induced and initial plant health.
  - My results have also been inconsistent for BLB and SLB with plant resistance activator Lifegard in my on-farm onion fungicide trials.
- FRAC P07 fungicide treatments (Rampart 3 qt/A) have performed consistently in our onion fungicide trials, which suggests that it is acting more as a fungicide than as a plant defense activator.
  - However, we have also been using it as if it was a fungicide (after disease onset and at high rates). Perhaps, if it was applied earlier at low rates, the plant defense activation would kick in?
- **For downy mildew (an oomycetes) control in hops in Oregon** with fosetyl-Al (trade name Alliette, different P07 sub-class than Rampart/Reveille), r**educed sensitivity was detected after 2 decades of use, which was overcome by doubling the rate of fungicide.** This is similar to our experience with FRAC 3 fungicides (e.g. Tilt, Quadris Top, Inspire Super, Viathon).
- Doubling rates of FRAC P07 fungicides worked for another decade in Oregon, at which time 2x rates failed to control the downy mildew in hops. Fungicide sensitivity testing at that time showed selection for even greater levels of fungicide insensitivity to which even 4x rates of FRAC P07 fungicide did not provide adequate control (Gent et. al., 2020).
  - In this situation, growers were exceeding the maximum use rates and number of applications per season (usually 6), including products sold as fertilizers.
- The mechanism for fungicide resistance (gene mutation(s) vs. selection of naturally occurring insensitive isolates) to FRAC P07 fungicides is not known.
- **FRAC P07 fungicides have been used for over 4 decades and continue to be a valuable tool in disease management, when used appropriately.**

Given that SLB is notorious for developing fungicide resistance in New York, including FRAC 2, 3, 7, 9 and 11, and maximum use rate for FRAC P07 fungicide Reveille is 7 applications (at the highest rate) (Note: Rampart has no maximum use limit), **it would be prudent to strive for no more than 5 applications of FRAC P07 fungicides per season.**

References

Dann, E. and A. McLeod. 2021. Phosphonic acid: a long-standing and versatile crop protectant (Review). Pest Management Science, 77: 2197-2208.

Gent, D.H., M. Block and B.J. Claasen. 2020. High levels of insensitivity of phosphonate fungicides in *Pseudoperonospora humuli*. Plant Disease, 104: 1400-1406.

Stoffella, P.J. and R. M. Sonada. 1982. Reduction of onion yields by chlorothalonil. HortScience, 17(4): 628-629.

Upcoming Events

Vegetable Pest and Cultural Management Field Meeting for Auction Growers -- Seneca

July 30, 2025 (Wednesday) | 7:00 PM - 9:00 PM
Jesse Stoltzfus' farm, 5907 Rt 414, Romulus, NY 14541

A hands-on demonstration of weed, insect and disease identification in vegetables including management options such as inter-row cover crops, grafting and where appropriate, spray options will be used to educate growers. Judson Reid, Senior Extension Associate with the Cornell Vegetable Program along with CCE staff will instruct participants and facilitate peer-based learning. Details on each topic will focus on field observations at these farms.

2.0 DEC credits in categories 10, 1a, 23, and 24.

This meeting will be held at the corner of Vineyard and Rt 414 in Romulus. FREE to attend. No pre-registration required. Contact Judson Reid, 585-313-8912, with questions.

Niagara Region Summer Meeting, 2025

August 7, 2025 (Wednesday) | 5:30 pm - 8:00 pm
J. Hurtgam Farms, 3226 Ridge Rd (Rt 104), Ransomville, NY 14131

We're in for a treat! Prof. Steve Reiners is coming as a part of his pre-retirement speaking tour! Steve's a fantastic, down-to-earth speaker with extensive knowledge on horticultural techniques, fertility, varieties, and much more. Don't miss this event! Topics include "What exactly do NPK and other nutrients do inside the plants?", a pest/disease field walk, sweet corn variety trial, a tar spot primer, spraying best practices, and industry updates. Content will be relevant for organic, CNG, and conventional growers. Pizza dinner at 5:30 pm; meeting to follow.

DEC credits available: 1.25 in categories 1a, 23; 0.5 in categories 10, 21; and 0.25 CORE.

Contact Elizabeth Buck with questions, emb273@cornell.edu, 585-406-3419.

Cornell Vegetable Variety Showcase and Pathology Twilight Meeting

August 20, 2025 (Wednesday) | 5:00 pm - 8:30 pm
Homer C. Thompson Vegetable Research Farm, 133 Fall Creek Rd, Freeville, NY 13068

The event will include discussion of disease management in several crops and variety showcases for tomato, squash, cucumber, pepper, potato, groundcherry and goldenberry. Variety tasting will be available. The event concludes with a social hour with refreshments.

2.0 DEC Pesticide Credits will be available in categories 10, 1a, and 23. Find the agenda and registration form at https://cals.cornell.edu/events/cornell-vegetable-variety-showcase-and-pathology-twilight-meeting. Registration requested by August 18. Questions? Email Greg Vogel: gmv23@cornell.edu

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VegEdge is the highly regarded newsletter produced by the Cornell Vegetable Program. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas, and research results from Cornell University and Cornell Cooperative Extension. VegEdge is produced every few weeks, with increased frequency leading up to and during the growing season.

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Cornell Vegetable Program

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