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Choanephora Rot in Vine Crops

Choanephora Rot

in Vine Crops

Elizabeth Buck, Cornell Cooperative Extension, Cornell Vegetable Program

Let's get this out of the way first – choanephora rot is pronounced like "con if or uh" – the joys of Latin, amiright?

Odds are you've seen choanephora rot on your farm before and might not have realized what it is. Choanephora rot (Choanephora cucurbitarum) is most commonly noticed in yellow squash production, though it can affect zucchini, pumpkin, and other vine crops. In warmer areas it can also attack eggplant, peas, beans, peppers and peas. Again, in NY this is primarily a problem in yellow squash production.

Choanephora rot starts out in the blossom end of the fruit. The fruit first become a darkened, water-soaked color that quickly progresses to an overall browning. There may be a slight whitish leading-edge delineating where the fungus is beginning to sporulate heavily. Once in full sporulation, choanephora rot is pretty unmistakable. Infected fruit develop a very fuzzy looking, dark gray to black, tall mold. You can see individual mold hairs, which are long and white with a dark capsule on the top. Very distinctive. The fruit underneath is incredibly soft and as such are difficult to effectively remove from the plant beyond the early stages of disease. Infected fruit will often fall right off into a slimy plop, smearing their fungal nastiness on all plant parts beneath it.



Yellow squash showing the long, gray Choanephora mold that appears as the disease progresses. Early symptoms on fruit match the water soaked, sunken areas at the upper end of the molds that begin pale and quickly turn brown. Photo by Meg McGrath, Cornell

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.

We're interested in your comments. Contact us at: CCE Cornell Vegetable Program 480 North Main Street, Canandaigua, NY 14224 Email: cce-cvp@cornell.edu Web address: cvp.cce.cornell.edu

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The next issue of VegEdge newsletter will be produced on August 18, 2021.

Accumulated Growing Degree Days, 8/9/21

Julie Kikkert, CCE Cornell Vegetable Program Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 - August 9, 2021

Location**	2021	2020	2019
Albion	1874	1807	1618
Arkport	offline	offline	offline
Bergen	1699	1763	1560
Brocton	1734	1732	1596
Buffalo*	1851	1855	1627
Burt	1606	1702	1472
Ceres	1523	1523	1540
Elba	1626	1690	1497
Fairville	1628	1721	1491
Farmington	1676	1743	1517
Fulton*	1635	1769	1489
Geneva	1722	1797	1603
Hammondsport	1623	1731	1528
Hanover	1711	1725	1580
Lodi	1420	1829	1638
Niagara Falls*	1794	1774	1566
Penn Yan*	1809	1861	1676
Rochester*	1747	1806	1723
Sodus	1771	1725	1461
South Bristol	1629	1712	1510
Varick	1641	1892	1689
Versailles	1641	1685	1558
Williamson	1609	1687	1448
* * * * * * *			

* Airport stations

** For other locations: http://newa.cornell.edu

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Blossoms can become infected, too. They will shrivel and grow the characteristic mold and will eventually slough off. Decay may continue to progress down the flower stalks as a wet, brownish rot. Diseased flowers can drop off onto lower leaves and stems, where they continue to decay. The size, color and furriness of these decaying blossoms hidden within the canopy led one of our technicians to begin calling this disease the "dead mouse mold". I thought that was a humorous and accurate description. Foliar infections can get going, those are dark wet lesions with – you guessed it – a fringe of the characteristic mold. I saw one heartbreaking pumpkin field this week that has a bad choanephora rot problem wherein the mold was directly attacking and rotting fruit, having gained entry through wounds in the rind. In the larger fruit of a pumpkin, choanephora causes a slimy decay with a mat of wet, black fungal growth over the exterior while the interior eventually turns to a soup full of secondary pathogens. The choanephora did not appear to directly attack unwounded, established pumpkin fruit in that case.

MANAGEMENT

There are not any effective fungicide programs to manage for Choanephora rot. Like none at all, not even in other states. That's because the disease has lots of spores and there are always new, susceptible flowers opening up in a yellow squash field. This problem has to be managed by improving the crop environment.

Choanephora likes wet and warm conditions, really enjoying the upper 70's. It tends to flair up after periods of a lot of rain (cough cough July) and in late summer. The dis-

ease is thought to be commonly present in soils, so it makes complete sense that it readily appears under favorable conditions. To fight back, you have to try to dry out that canopy. And that really means the inside of the canopy, where new flowers and fruit are forming. Much more easily accomplished in yellows than vining cucurbits. So, functional control steps:

- 1. Stop overhead watering. If you must, irrigate during midday so the plant surfaces will dry out faster.
- 2. Clean up weeds. In addition to setting seeds and making a robust seedbank for next year, weeds really do impede airflow and help moisture stick around in the canopy.
- 3. Remove infected young yellow squash to reduce the amount of sporulation within the canopy
- 4. Wait and hope for a shift in the weather.

Most years, choanephora will attack a couple fruit sets during favorable weather, or strike in a low or wet spot of the field. In these common scenarios the disease will often retreat to a background level or clear up on its own. The weather pattern this year is promoting sustained choanephora infections. Under these conditions, badly infected fields can be hard to turn around.

For mitigating the risk of choanephora losses in the future:

- 1. Use raised beds. Raised beds increase water drainage and increase airflow.
- 2. Use of mulch can reduce Choanephora rot problems by preventing fruit contact with the soil.
- 3. Avoid planting late yellow squash into fields with poor air drainage, like an area that holds water or is surrounded by wood lot. Planting late squash on a field that is prone to morning fog from nearby streams is also going to be a higher risk move.
- 4. Rotate all cucurbits out of problem fields.

being vaccinated.

Webinars Offered in English and Spanish About COVID-19 Vaccines

The Cornell Farmworker Program and the Finger Lakes Community Health clinic are co-sponsoring two free webinars (one in English and another in Spanish) with Dr. José Canario, Medical Director of Finger Lakes Community Health, and Ellen Hey, NP.

Doubts About COVID-19 Vaccines? Ask the Doctors

Tuesday, August 24, 2021 @ 4:30 PM (ET) - English session

Tuesday, August 24, 2021 @ 7:00 PM (ET) - Spanish session This one-hour webinar will discuss issues surrounding vaccine hesitancy and other barriers to vaccination. Dr. Canario and Ms. Hey will respond to your questions. Local farmworkers will be available to answer questions about their experiences

Please register as soon as possible. <u>Register online (English)</u> or register by phone/text at 607-224-8821, include your name, city where you live, and your questions. After registering, you will receive instructions on how to connect to the call on the 24th.

If you have any questions, contact the Cornell Farmworker Program at farmworkers@cornell.edu or call 607-224-8821.



Decaying shed blossom infected with choanephora and associated foliar lesions. *Photo by Meg McGrath, Cornell*

Running Out of Fungicide Options for Control of Stemphylium Leaf Blight in Onion

Christy Hoepting, CCE Cornell Vegetable Program, and Frank Hay, Dept. of Plant Pathology, Cornell Agri-Tech, Geneva

The following are the main fungicide resistance management strategies that we have recommended during the past few years in hopes of preserving the useful longevity of moderate- to high-risk fungicides for pathogens developing fungicide resistance in FRAC (Fungicide Resistance Action Committee) groups 2, 3, 7 and 9 for control of Stemphylium leaf blight (SLB) in onion.

- No more than 3 applications (ideally 2) per FRAC 2, 3, 7 and 9.
- No more than 1-2 applications before rotating to a different FRAC group.
- Rotate among sub-classes within FRAC groups (e.g. rotate FRAC 7 Luna Tranquility with Miravis Prime).
- Rotate among active ingredients within sub-classes of a FRAC group (e.g. Inspire Super/Quadris Top with Tilt or Viathon).

Grower adoption of consequent complicated fungicide programs has been tremendous. Despite this, SLB has developed fungicide resistance to all of these FRAC groups.

Many onion fungicide spray programs have two sprays left and have already used 2-3 applications of FRAC 3, and 2 applications of FRAC 7, and/or have reached maximum seasonal use rates for Viathon (max: 6 pt) and Tilt (max: 16 fl oz). Finishing these spray programs with "broken" fungicides and following resistance management strategies is proving to be very challenging.

CHEAT ON FRAC 3 OR FRAC 7?

By "cheating" we mean using more than three applications of FRAC 3 or more than two applications of FRAC 7. **If you decide to** "cheat" on FRAC 3, finish with FRAC 3 + 3, because increasing the rate has helped to stave off fungicide resistance. Theoretically, resistant isolates that would escape a low rate or single product application of FRAC 3 fungicide would be killed by a high rate or double product FRAC 3 fungicide application.

Examples of FRAC 3 + 3 treatments other than Viathon/Quadris Top + Tilt:

- Inspire Super 20 fl oz (FRAC 3b + 9b) + Quadris Top 14 fl oz (FRAC 3b + 11). The maximum allowable seasonal use rate for 3b is equivalent to a total of four maximum rate applications among these two products (e.g. 4 apps of Inspire Super 20 fl oz, 4 apps of Quadris Top 14 fl oz, or 2 apps of Inspire Super 20 fl oz + Quadris Top 14 fl oz).
- Cevya 5 fl oz (FRAC 3d) + Inspire Super/Quadris Top (FRAC 3b). This is a new FRAC 3 by BASF with a different active ingredient than Quadris Top/Inspire Super, Tilt and Viathon that now has a supplemental label on onion in NY. In 2020 on-farm field trial in Elba, it was not significantly different than the untreated for leaf dieback (same as other single product applications of Inspire Super, Quadris Top and Tilt), but had some activity on SLB target spots (similar or slightly better than Inspire Super/Quadris Top and Tilt). FRAC 3 d + FRAC 3 combinations have not been trialed in the field, but presumably would improve SLB control over a single product application.

Can FRAC 7 be broken more than it already is? SLB isolates collected from across the state went from having 0% of the gene mutations known to confer fungicide resistance to FRAC 7 fungicides in 2016 to 100% in 2020. Although in 2020 on-farm small-plot fungicide trials in Elba muck, FRAC 7 fungicides Miravis Prime and Luna Tranquility had significantly greener foliage/less leaf dieback than the untreated controls, they were only half as green as the best treatment in the trial (Viathon + Tilt). Unlike in 2016 when Luna Tranquility had the greenest foliage/least leaf dieback in the trial. Alternatively, in Oswego on-farm trial in 2020, these FRAC 7 fungicides were as good as the best treatment (Quadris Top + Tilt). Thus, regional differences appear to be occurring. We have also now learned that cross-resistance among the different FRAC 7 fungicides, Luna Tranquilty/Experience, Endura/Pristine and Merivon exists, which appears to also occur with Miravis Prime. So far, in 2021 on-farm fungicide trials Luna Experience and Miravis Prime have looked okay for controlling SLB targets, but we have not vet looked at leaf dieback. FRAC 7 fungicides also have good activity on BLB halo lesions. Once FRAC 7 resistance occurs, it seems to increase despite management practices. So while further application is not good, it is not likely to affect the outcome in terms of eventually developing resistance.

AIM FOR PREVENTING SLB LEAF DIEBACK FOR THE HOME STRETCH

Previous fungicide trial results suggest that % green foliage from 50% lodging (usually timing of last pesticide spray) until 100% lodging is critical for reaching maximum yield potential and bulb quality. If onions die standing up, the risk of bacterial bulb rot increases. Therefore, it would be ideal to use fungicides with best activity on SLB leaf dieback for last 2-3 sprays. This year, heavy rainfall and cooler temperatures during early bulbing were favorable for leaf diseases, so many growers decided to apply fungicides with best activity on preventing SLB leaf dieback during this time. This has proven to be beneficial strategy.

The top treatments for keeping onion foliage green/preventing leaf dieback in both 2020 and 2021 (so far) field trials include:

- Viathon 3 pt (FRAC 3c + P07) + Tilt 8 fl oz (FRAC 3a). It is worth noting that this combo is failing to control Botrtyis leaf blight (BLB) halo lesions in 2021 trials. In spite of this, it is still doing a good job keeping onions green. It has some activity on BLB necrotic spots, but is not as good as Inspire Super and Quadris Top + Tilt.
- Luna Tranquility 16 fl oz (FRAC 7(1) + 9a) + Rovral (FRAC 2). It is worth noting that this combination continued on page 5

continued from page 4

can let in some SLB target spots, despite its ability to keep onion foliage green.

3. Quadris Top (FRAC 3b + 11) + Tilt 8 fl oz (FRAC 3a). We are also noticing that this treatment is letting in SLB target lesions. It is reasonably effective on BLB halo lesions and necrotic spots.

Also, in 2021 on-farm onion fungicide trial in Elba, other treatments that appear to be keeping onion foliage green include:

- Luna Experience 12.8 fl oz (FRAC 7(1) + 3c) + Rampart 3 qt (FRAC P07). If you have already used 2 apps of Viathon 3 pt, there is not enough FRAC 3c left to make a 12.8 fl oz application of Luna Experience, because it will exceed the maximum seasonal use rate according to the Luna Experience label. If you have only made one application of Viathon, or cannot acquire Viathon, this may be a nice option for you. Data has not been analyzed to determine whether Luna Experience + Rampart is statistically better than Luna Experience alone.
- Omega 16 fl oz (FRAC 29). In Elba, this treatment is demonstrating excellent control of BLB halo lesions. Although it does not appear to have much control of SLB target spots, it does appear to have some activity (not as good as the top 3) on preventing SLB leaf dieback/keeping onion plants green (as it did in 2020 trial). It also has activity on downy mildew (DM), so if risk for DM is low, mancozeb would not need to be added to the tank mix. Most importantly, it has a novel FRAC group that may be used in rotation with FRAC 3 and/or 7.
- Scala 9 fl oz (FRAC 9a) + Rovral 1 pt (FRAC 2). This may not be the case in Oswego, as Scala and Rovral have historically not worked as well on SLB in Oswego as it does in Elba. In many spray programs, 2-3 applications of FRAC 2 and 9 have already been made, so may not be a sensible fit.

See <u>Cornell Onion Fungicide Cheat Sheet</u> for breakdown of products, active ingredients, relative performance and maximum allowable uses on the Cornell Vegetable Program website (https://cvp.cce.cornell.edu) on the Onion page.

Sneak Peek at Elba Onion Fungicide Trial

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program

August 3, 2021 – 8 days after 3rd spray



Untreated



Viathon 3 pt + Tilt 8 fl oz weekly Jul 12, 20, 26



Viathon 3 pt + Tilt 8 fl oz bi-weekly Jul 12 & 26 (insecticide only on Jul 20)



Jul 12: Miravis Prime 11.4 fl oz Jul 20: Scala 12 fl oz + Rovral 1 pt Jul 26: Viathon 3 pt + Tilt 8 fl oz



Omega 1 pt weekly Jul 12, 20, 26 (photo taken Aug 11)

- Elba fungicide trial, c.v. Hamilton (120 days)
- Prior to onset of fungicide trial treatment, this field had been treated with Badge, Bravo and Rampart.
- First SLB fungicide applications were made when onions had 8-9 leaves, 1-inch bulbs and foliage was green to the tip.
- Viathon 3 pt + Tilt 8 fl oz weekly has the greenest foliage, which is not much different than Viathon 3 pt + Tilt 8 fl oz bi-weekly. This suggests that applying a good fungicide every other week has sufficed.
- Fungicide program with Miravis Prime, Scala + Rovral and Viathon + Tilt (timed to onset of tipburn) was almost as effective as Viathon + Tilt weekly. The 4th spray in this treatment will be Luna Tranquility + Rovral to be followed by Cevya + Inspire Super, and then Viathon + Tilt at 50% lodging.
- Omega belonging to novel FRAC 29 is showing some promise at keeping foliage green compared to the untreated, and may suffice to be used in rotation with FRAC 3 and 7. It does let SLB target spots through, but is excellent at controlling BLB halo lesions.

CR P Insights

Observations from the Field and Research-Based Recommendations

BEETS

A slight uptick in Cercospora lesions over the past week in fields we scouted but the disease was being held back by very dry field conditions. Localized storms this week will spread spores through the field via rainsplash. The CLS forecast is quite varied in our region from low to high based on predicted temperature and relative humidity. For a specific weather station see https://dev.newa.cornell.edu/beet-cercospo-ra-leaf-spot - JK

CARROTS

Storms in the area this week increase the risk for bacterial leaf spot caused by Xanthomonas campestris pv. carotae, and other diseases. Make sure to properly identify which leaf spot you observe because bacterial leaf spot treatment consists of copper applications as soon as an infection is detected. Alternaria leaf blight and Cercospora leaf blight are managed with fungicides (see the 2021 Cornell Vegetable Guidelines for available options). - JK



Cercospora lesion found this week as viewed through a 10X hand lens. Note the tiny black dots which are the spore producing pseudostromata which are diagnostic. *Photo: J. Kikkert, CCE*

DRY BEANS

There is an abundance of white mold in fields that were planted early and have developed dense canopies. If your beans are still in flowering stages, be sure you apply fungicides before bloom is over. 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.

Western Bean Cutworm (WBC) trap catch numbers are now decreasing at all locations indicating that all trap locations have hit peak flight over the past couple of weeks (see table). Dry bean pod scouting should begin 7 to 10 days after peak emergence, regardless Western bean cutworm (WBC) adult numbers by date for each dry bean trap location. Traps were set on 6/29/21. Numbers in red indicates peak flight.

Dry Bean Location	7/13/21	7/20/21	7/27/21	8/3/21	8/10/21	Cumulative WBC
Avoca Hill (Steuben Co.)	4	35	269	167	38	518
Avoca Valley (Steuben Co.)	1	17	97	94	9	218
Caledonia (Livingston Co.)	9	27	102	80	21	239
Pavilion (Genesee Co.)	0	22	87	67	36	213
Penfield (Monroe Co.)	1	74	124	278	64	550
Penn Yan E (Yates Co.)	1	8	18	20	11	58
Penn Yan N (Yates Co.)	2	0	12	29	2	45
Riga (Monroe Co.)	2	47	62	42	25	178
LeRoy (Genesee Co.)	15	62	86	35	1	200
Wyoming (Wyoming Co.)	3	25	90	115	73	306
Wayland (Steuben Co.)	5	21	277	231	116	656

of cumulative WBC trap catch, and especially where WBC has been found in bean pods/seeds in recent years. See previous VegEdge issues for tips on scouting. A spray is recommended if dry bean pod damage is found. - ML

ONIONS

There is tremendous variability in crop stage at the moment with some fields already harvested, to others undercut or 100% lodged to others that are in early stages of lodging to others that have not even started to lodge. Many fields are bulbing nicely. At sites that have fields in various stages we are seeing a lot of movement of onion thrips from lodged fields to nearby fields. This week's heat and rain is expected to move the crop along. Generally, thrips pressure remained low and/or under control this past week with several fields not needing to apply insecticides and Radiant working well in others. Stemphylium leaf blight (SLB) was quite variable this week and ranged from "laying low" to emerging as a primary pathogen with target spots developing on green tissue, "showy" purple and black target spots and black sporulation in the necrotic leaf tips. Typically, we see SLB build during the month of August so it is not uncommon for SLB target lesions to increase despite use of SLB fungicides. SLB has developed fungicide resistance to varying degrees to fungicides belonging to FRAC 2, 3, 7 and 9, and we are noticing that these products are letting in more spots. Fungicide activity on SLB toxins that cause leaf dieback is also important. Viathon + Tilt appears to be the best combination at keeping the onions green, while Luna Tranquility + Rovral and Quadris Top + Tilt are appear to be doing a good job at keeping the onions green in the Elba on-farm fungicide trial, despite letting in SLB target spots. Finishing out fungicide spray programs without exceeding three apps per FRAC is proving to be challenging – see article on page 4 and sneak peek at onion fungicide trial on page 5. Forecasted hot weather this week is not conducive for downy mildew, so mancozeb, FRAC P07 in Viathon or FRAC 11 in Quadris Top should suffice. - CH

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POTATOES

The second generation of Colorado potato beetles are in fields now. Monitor fields for small larvae in order to time insecticides for best management.

Simcast forecasting indicates that Ceres, Fairville, Farmington, Fulton, Sodus, and Wellsville have surpassed the 30 blight units (BU) needed to trigger a spray for late blight. Many other sites are expected to surpass 30 BU by the end of the week. For locations that are not close to a weather station, forecast information should only be used as a general indication of how favorable weather has been for late blight. Forecast BUs are subject to changes as the weather forecast changes, so check forecasting tools regularly to see if disease forecasts have changed. Weather data used to calculate SVs comes from weather stations located at each site, and can be accessed via http:// newa.cornell.edu/index.php?page=all-weather-data. Late blight has been reported in Maine in potato in the last week in addition to past reports in GA and WI. - ML

Late Blight Risk Chart, 8/11/21

Location	Blight Units 8/4-8/10 ¹	Blight Units 8/11-8/13²	Location	Blight Units 8/4-8/10	Blight Units 8/11-8/13
Albion	6	8	Geneva	24	5
Arkport	-	-	Hammondsport	18	9
Baldwinsville	0	7	Knowlesville	5	9
Bergen	10	6	Lyndonville	18	13
Brant	22	6	Medina	25	9
Buffalo	22	5	Niagara Falls	28	7
Burt	23	8	Penn Yan	29	10
Ceres	44	10	Rochester	28	9
Elba	5	6	Sodus	44	6
Fairville	30	6	Versailles	0	5
Farmington	37	6	Wellsville	45	16
Fulton	34	9	Williamson	0	5

Calculated using a May 26 crop emergence date. Last fungicide application Aug 4 on susceptible cultivar Reba.

1 Past week Simcast Blight Units (BU)

2 Three-day predicted Simcast Blight Units (BU)

SNAP BEANS

Much of our area has been very dry over the past week. Storms coming through this week will increase the risk of diseases once again. Protect beans from white and gray mold infections during the bloom stage. - JK

SQUASH

<u>Cucurbit Downy Mildew</u> in 2021 appears to be affecting much more than just cucumbers. Symptoms are now found on gourds, winter squash and others vine crops. In previous years this disease has not been a threat to these crops, and managing for Powdery Mildew proved sufficient. It is very important that winter squash and pumpkin growers use a Downy Mildew spray program to protect their crop as we move toward the fall market. See the <u>July</u> <u>14 issue of VegEdge</u> for spray recommendations. - JR

WATERMELONS

Gummy Stem Blight is a common disease in watermelon patches this year. Look for dark spots on the ledges of leaves, which eventually blight with entire vines collapsing. On the stem, long, oval lesions are a common symptom. Unfortunately, this blight is most evident just prior to maturity. Infection likely occurred weeks ago. However, managing the disease in watermelons is important where winter squash are grown, as the spores cause Black Rot of squash fruit. Preventing Powdery Mildew through varietal resistance and appropriate fungicide application will decrease Gummy Stem Blight problems. See June 30 issue of VegEdge for Powdery Mildew sprays. - JR



Symptoms are slightly different on each vine crop, however the unique spots bound by leaf veins on the upper surface, with dark spores below is diagnostic. *Photo by J. Reid, CCE*



The color of the spores of Downy Mildew are generally darker than Powdery Mildew and are found on the underside of the leaf. *Photo by J. Reid, CCE*



Gummy Stem Blight causes vine collapse just as fruit is maturing. *Photo by J. Reid, CCE*

Is Your Farm Covered by the Produce Safety Rule?

Elisabeth Hogdon and Crystal Stewart-Courtens, CCE Eastern NY Commercial Horticulture Program, and Robert Hadad, CCE Cornell Vegetable Program

The federal Food Safety Modernization Act (FSMA) was passed ten years ago by President Obama in 2011. Within FSMA, the Produce Safety Rule (PSR) regulates fresh produce for the first time. Rather than responding to individual foodborne illness outbreaks in produce, the PSR aims to prevent microbial contamination during growing, harvesting, and handling of produce. The rule contains requirements for worker training, water testing, soil amendment application, cleaning and sanitizing, and other activities. Farms and businesses that grow, pack, or hold produce are subject to the PSR.

Not all produce farms in the U.S. are covered by the PSR. Farm coverage and inspection scheduling depend on produce sales and farm size. Is your farm covered? Consider the crops you grow and value of your produce sales, your total food sales, and your markets.

PRODUCE SALES

To determine where a farm fits under the regulations, accurate production and sales records are needed. For purposes of compliance calculations, three years of sales records are required to establish a rolling average. Farms selling small amounts of fresh produce are exempt from the regulatory burden of the PSR: Farms selling less than \$25,000 of fresh produce annually are fully exempt.

Adjusting for Inflation

Produce and total food sales values set by the Produce Safety Rule in 2011 are adjusted for inflation each year. In 2021, the following values are used to determine exemptions:

Total produce sales determining exemption: \$25,000 (2011) = \$29,232 (2021)

Total food sales determining qualified exemption: \$500,000 (2011) = \$584,634 (2021)

PRODUCE TYPE

Produce that is commonly consumed raw, such as lettuce and strawberries, are at higher risk for foodborne illness outbreaks because they are seldom subjected to cooking or processing that kills pathogens. These "covered" crops are subject to the PSR. The FDA has published a list of produce that is rarely consumed raw, which was developed based on consumer survey results. These crops present less risk because they are cooked by most consumers before eating. They are not covered by the PSR. Growers selling a combination of produce commonly and rarely consumed raw will be subject to the Produce Safety Rule based on total produce sales, as described previously. Both crop types are included in the total sales. Farms growing only crops rarely consumed raw, crops destined for processing (e.g. canning, wine-making, etc.), or agronomic crops (e.g. grains and oilseeds) are not covered by the rule.

If produce sales are above \$25,000 (plus inflation), then the type of produce grown needs to be considered as noted above. For example, a farm may grow \$30,000 worth of sweet corn and \$1,000 worth of lettuce. Their combined value (\$31,000), places the farm above the exemption threshold. The lettuce crop is subject to the PSR, but the corn is not. Many farms prefer to treat all of their crops by the PSR standards for simplicity, but crops may be managed separately by PSR coverage.

Produce Rarely Consumed Raw

The <u>FDA's list</u> of produce <u>not covered</u> by the Produce Safety Rule includes:

Asparagus, beans (black, great northern, kidney, lima, navy, and pinto), garden beets (roots and tops), sugar beets, cashews, sour cherries, chickpeas, cocoa beans, coffee beans, collards, sweet corn, cranberries, dates, dill (seeds and weed), eggplant, figs, ginger, hazelnuts, horseradish, lentils, okra, peanuts, pecans, peppermint, potatoes, pumpkins, winter squash, sweet potatoes, and water chestnuts.

The FDA considers this list to be <u>exhaustive</u>. Other crops that are typically cooked may not appear on the list (e.g. parsnips). These crops are considered covered by the PSR.

QUALIFIED EXEMPTIONS

A covered farm selling more than \$25,000 worth of produce may be qualified exempt if they sell less than \$500,000 in total food sales directly to local consumers. Qualified exempt farms are subject to minimal modified requirements, including records to demonstrate that the farm satisfies the criteria for a qualified exemption, and signage at points of sale as well as carton/box labels with farm contact information if selling to restaurants and supermarkets.

In order to be qualified exempt, farms <u>must meet</u> the following requirements:

- Total food sales must be less than \$500,000 annually (average, adjusted for inflation) over the last three years. Food sales include, but are not limited to, the following:
 - Produce
 - Pickles, jellies and jams
 - Baked goods
 - Fluid milk sales
 - Meat
 - Maple syrup
 - Hay, grain, pet food, other animal feed

Many farms in NY are diversified and sell a mixture of products from various farm enterprises. All of these food products must be totaled for qualified exemption status records. Additionally, if a farm buys and resells food products at their farm stand or for their CSA, they must be included in total food sales.

 To be qualified exempt, farms must also <u>sell</u> <u>>50% of their products directly to "qualified</u> <u>end users."</u> Qualified end users are defined as
 either the actual consumer of the food, or a restaurant or retail food establishment located in the same state/Indian reservation <u>or within 275 miles from the farm</u>. Examples of qualified end users could be:

- CSA members
- Farmers market customers
- Farm stand customers
- Pick-your-own customers
- Local restaurants
- Local grocery stores or food co-ops
- Buyers at produce auctions who in turn resell the purchased produce at their local farm stand

Examples of customers that are **NOT** considered qualified end users:

- Wholesale produce distributers
- Chain stores selling across the country
- Slaughterhouses or processing facilities that purchase the animals (rather than providing a service for fee)

A key to understanding whether a wholesale distributer is considered a qualified end user is determining whether the distributer is an intermediary. If the distributer purchases the product from the farm, and in turn resells it to a retailer, it is not a qualified end user.

Farms that are in the process of downsizing or changing their mixture of enterprises may find that their produce is subject to the PSR in 2021 despite smaller food sales. Higher food sales values in 2018, 2019, and 2020 drive the threeyear rolling average.

COVID-19 Pandemic Changes to Qualified End User Requirement

In 2020 and 2021, pandemic disruptions have caused many farms to alter their marketing strategies. To accommodate these changes, the <u>FDA announced</u> that they are temporarily suspending enforcement of the qualified end user requirement for qualified exemptions until further notice.

EXAMPLE FARM SCENARIOS

Farm A: Farm A sells a running three-year average of \$45,989 worth of mixed fresh produce (lettuce, winter squash, tomatoes, herbs, etc.). They also sell broilers, eggs, beef, and lamb (\$30,000). They sell all of their meat and produce through three local farmers markets in their area, as well as a limited amount of door-to-door online deliveries in their town. Their livestock are processed at a local facility for a fee. Farm A is qualified exempt. Their average produce sales in the past three years was greater than \$29,232, but their total farm sales are less than \$584,634. All sales are direct to consumers.

Farm B: Farm B sells a running three-year average of \$32,000 in produce through a produce auction and sells \$40,000 in livestock to a processing facility who distributes the meat to various buyers. Total food sales are less than \$584,634 but greater than 50% are not direct to the consumer. Farm B will not be qualified exempt and they will fall under the PSR regulations.

Farm C: Farm C is located in Orleans County, NY. They sell a three-year running average of \$450,000 of produce through a farmers market in New York City. The sales are less than \$584,634 but the distance of the location of the sales is greater than 275 miles. This farm is qualified exempt because their sales are within the same state, despite being >275 miles away.

ADDITIONAL RESOURCES

If you are unsure whether your farm is covered by the Produce Safety Rule, contact the New York State Department of Agriculture and Markets:

Aaron Finley, 518-474-5235, aaron.finley@agriculture.ny.gov

Steve Schirmer, 315-487-0852, steve.schirmer@agriculture.ny.gov

NY Sweet Corn Trap Network Report, 8/10/2021

Marion Zuefle, NYS IPM Program; from http://sweetcorn.nysipm.cornell.edu

Statewide, 28 sites reported this week. European corn borer (ECB)- E was caught at 5 sites and ECB-Z was caught at 6 sites. The hybrid ECB was caught at two of the five sites trapping for it: Bellona (1) and Hurley (77). Corn earworm was caught at 11 sites with 9 sites high enough to be on a 5 or 6 day spray schedule. Fall armyworm (FAW) was caught at 9 sites this week with the average catch continuing to drop. Western bean cutworm (WBC) was caught at 25 sites. Trap catches for WBC peaked last week with a drastic drop in average catch for this week. Based on degree day accumulation most sites are well over 90% flight completion for WBC using the NEWA WBC Flight Emergence Lookup Table.

Fields that are in whorl or early tassel stage should be scouted for WBC egg masses with a 4% threshold for processing sweet corn and a 1% threshold for fresh market sweet corn. It takes between 5-7 days WBC eggs to hatch. It is critical that sprays are timed before the larvae have a chance to enter the ear. The egg mass will become purple in color approximately 24 hours before egg hatch. Here is a <u>video from Purdue on scouting for WBC egg</u> <u>masses and larvae</u>.

WNY Pheromone Trap Catches: August 10, 2021

ECB-E	ECB-Z	ECB Hybrid	CEW	FAW	WBC	DD to Date
0	0	NA	0	1	6	3206
0	0	1	0	0	7	3183
1	0	NA	0	1	3	3273
NA	NA	NA	NA	NA	NA	3076
0	0	NA	2	0	0	3200
0	0	0	0	0	4	3170
NA	NA	NA	NA	NA	NA	3176
0	2	NA	0	1	7	3167
0	0	NA	0	0	4	3112
0	0	NA	2	0	25	2884
NA	NA	NA	NA	NA	NA	2878
0	1	0	0	0	5	3087
NA	NA	NA	NA	NA	NA	2815
0	0	NA	0	0	22	3218
0	1	0	0	0	14	3121
0	0	NA	0	0	4	2960
	ECB-E 0 0 NA 0 NA 0 0 0 0 NA 0 0 NA 0 0 0 0 0	ECB-6 ECB-2 0 0 0 0 1 0 NA NA 0 1 NA NA 0 1 0 1 0 1	ECB- ECB- 0 0 0 0 1 0 1 0 1 0 NA NA NA NA 0 0 NA NA NA NA <	ECB- ECB Hybrid CEW 0 NA 0 0 NA 0 0 NA 0 1 0 NA 0 1 0 NA 0 1 0 NA 0 1 0 NA 0 NA NA NA 0 0 0 NA 2 0 0 NA 2 0 0 NA 3 0 1 0 3 0 1 0 3 0 1 0 3	ECB- ECB- FCB- CEW FAW 0 NA 0 1 0 0 1 0 0 10 0 1 0 0 11 0 1 0 1 11 0 NA 0 1 11 0 NA 0 1 11 0 NA NA NA 11 0 NA NA NA 11 0 0 0 1 11 0 0 0 0 11 0 0 0 0 11 0 0 0 0 11 0 0 0 0 11 0 0 0 0 11 0 0 0 0 11 0 0 0 0 11 0 0 0	ECB- ECB- FCB- CEW FAW WBC 0 0 NA 0 1 6 0 0 1 0 1 6 0 0 1 0 1 6 0 0 1 0 1 3 0 0 NA 0 1 3 NA NA NA NA NA NA 0 0 NA 2 0 0 0 0 NA 2 0 0 0 0 NA 2 0 0 0 0 NA NA NA NA 0 2 NA 0 1 7 0 0 NA 2 0 25 NA NA NA NA NA NA 0 1 0 0 2 2

ECB: European Corn Borer; CEW: Corn Earworm; FAW: Fall Armyworm; WBC: Western Bean Cutworm; NA: not available; DD: Degree Day based on accumulation starting March 1 (base 38) for WBC emergence

Water Testing Requirements for Food Safety

Caitlin Tucker, Cornell Cooperative Extension, Cornell Vegetable Program

Even on the best of days, water testing requirements for food safety can feel a bit murky. Let's walk through key terms, compliance dates, and tips to ensure you're set up for success.

WHAT ARE YOU TESTING FOR?

The presence of "generic" *E. coli* indicates that water sources may be contaminated with feces. There are many strains of *Escherichia* (*E.*) *coli* found in the environment, in the soil, and in the intestines of people and animals. Most are harmless, but some strains cause foodborne illness. Because generic *E. coli* is more likely to be associated with feces, it is used as a general indicator of whether water could be contaminated with harmful strains of *E. coli* or other pathogens.

QUANTITATIVE VS. QUALITATIVE TESTING

Quantitative water testing will count (or quantify) the amount of generic *E. coli* in your water. Qualitative water testing will simply tell you whether generic *E. coli* is present or absent in your water.

FSMA COMPLIANCE

For those farms that are covered under the Food Safety Modernization Act, water testing requirements will be enforced beginning on the following dates:

- January 2022 Large Farms (>\$500,000)
- January 2023 Small Farms (\$250,000 \$500, 000)
- January 2024 Very Small Farms (<\$250,000)

FSMA requirements for water testing differ depending on the source of water and what the water is being used for. Under the umbrella of "agriculture water", FSMA separates out "Production" water and "Post-Harvest" water. **Production Water** is any water used for irrigation, frost protection, fertigation, dust abatement, etc. Water that is used in these production activities and comes into contact with covered produce must be quantitatively tested. Post-harvest Water is water used in harvest or post-harvest activities like washing, cooling, ice-making, cleaning and sanitizing, handwashing, etc. **Post-harvest water** must meet the standard of no detectable generic *E. coli* based on a 100 mL water sample. Post-harvest water can be tested using quantitative or presence/absence methods.

Note: FSMA outlines a number of approved testing methodologies that can be used to assess water quality: <u>https://www.fda.gov/media/107656/download</u>. If you would like a paper copy, see contact information below.

THIRD PARTY AUDITS

Water testing is a common requirement for GAPs, HGAPs, Primus, and other third-party audit programs. We encourage you to check with your auditor to confirm what type of water testing is acceptable for your audit program.

WHERE TO SEND YOUR WATER SAMPLES?

Most quantitative water tests require that samples be submitted to the lab within 6 hours of sampling. Samples submitted for qualitative testing usually have to return within 30 hours, so choose a lab that's relatively close! Many County Departments of Health offer water testing needed for FSMA or 3rd party audits. Find a laboratory near you at <u>https://foodsafetyclearinghouse.org/</u> <u>resources/national-water-quality-testing-labs-map</u>

When you have identified a lab:

- confirm that they offer the water test(s) that you need
- confirm how soon the sample needs to arrive at the lab (also referred to as the maximum hold time)
- request water sampling instructions
- ask if they offer on-farm sample pick-up
- ask if they offer sampling supplies for free (they typically do), and if they can mail them to you. They should be able to send you a bulk order so that you have some on hand when you need them. Keep bottles closed until sampling, do not rinse out prior to sampling, and store in a clean area until ready to use.

SAMPLING FREQUENCY

The below testing frequencies are required by FSMA. If you are not covered under the rule but are seeking a 3rd party audit your testing frequency may vary. Confirm with your local CCE office or your auditor.

Municipal (city water) – Currently, FSMA does not require testing of municipal water as long as you obtain a copy of the Municipalities' annual report/certificate. However, we would still recommend at least an annual sample from the spigot or main faucet to confirm that it is not being contaminated somewhere along your distribution system.

Well Water (groundwater) – Four or more times during the initial year. In subsequent years, you will add 1 or more rolling samples. Consider using the following in year one:

- Sample at beginning of season
- Sample leading up to peak production
- Sample at peak production
- Sample prior to harvest

Surface Water (ponds, streams, lakes, creeks, etc.) – Surface water is at high risk of contamination because it is exposed to the environment. Since surface water quality can be quite variable, FSMA requires testing 20 times or more over a period of 2-4 years with 5 or more samples added every year after your initial survey.

MORE INFORMATION

For more information on water testing for FSMA or third-party audits, contact Robert Hadad (<u>rgh26@cornell.edu</u>, 585-739-4065) or Caitlin Tucker (<u>cv275@cornell.edu</u>, 573-544-4783). ●

Upcoming Events

Events are listed at CVP.CCE.CORNELL.EDU

Chautauqua County Soil Health Field Day August 25, 2021 (Wednesday) | 9:15am - 12:30pm Lesch Farms, 4893 W Main Rd (tent in field), Fredonia, NY

1.5 NYS DEC pesticide recertification credits available (Category 1A and 21). This is a soil health field day with presentations and demonstrations:

- Overview of Lesch Farms tillage and cover crop practices and equipment
- Info on programs available from USDA-Natural Resources Conservation Service and Chautauqua County Soil and Water Conservation District to assist with implementing soil health practices.
- NY Soil Health Trailer demonstrations
- pest challenges with changing tillage practice
- View and discuss soil pits, highlighting soil health indicators and how soil properties influence soil function

FREE to attend; no pre-registration required. QUESTIONS? Contact Lisa Kempisty, Extension Educator in Chautauqua County at 716-664-9502, Ext 203.

Wash/Pack Project Improvement Workshops Wednesday evenings (dates below) | 6:00pm - 8:30pm Live online (and recorded for future viewing)

The <u>SCRUB (Sanitizing and Cleaning Resources for yoUr Business</u>) Specialist are available to help you overcome a post-harvest bottleneck, or improve your wash/pack. Topic areas and workshop dates are listed below. **Space is limited to 15 farms per topic.** To indicate your interest in participating, please complete a short form at: <u>https://forms.gle/JYVeJVdfUKsGh3dz9</u> Please sign up by August 16, 2021.

Farms that sign up for individual assistance with their projects will be asked to take part in a virtual workshop with other growers working on the same topic, where challenges, plans and resources are discussed as a group. As a participant, you will:

- Complete a draft project improvement plan (a template will be provided to guide this process)
- Implement the revised project plan on your farm
- Document your results with photos and a brief description of what you did and share with workshop leads

September 1 – Bin Blitz – Experienced growers and UVMs Ag Engineering present new strategies and cleaning tools to increase the efficiency and efficacy of bin cleaning, sanitation and management practices.

September 8 – Low Cost and High Value – Evaluate low-cost improvements that make a big difference.

September 15 – Wash/Pack Floors – Learn to improve or repair a concrete floor so that it is smooth and easy to clean.

September 22 – Wash Water Management

September 29 – Employee Management and Empowerment

October 6, 2021 – Bubblers/Aerators for Greens Washing

Contact Robert Hadad (<u>rgh26@cornell.edu</u>, 585-739-4065) or Caitlin Tucker (<u>cv275@cornell.edu</u>, 573-544-4783) for more info.

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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 frequency increasing leading up to and during the growing season.

Contact Us VEGETABLE SPECIALISTS

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Robert Hadad | 585-739-4065 cell | rgh26@cornell.edu farm food safety, organic, business & marketing, fresh market vegetables

Christy Hoepting | 585-721-6953 cell | cah59@cornell.edu onions, cabbage, broccoli, garlic, pesticide management

Julie Kikkert, Team Leader | 585-313-8160 cell | jrk2@cornell.edu processing crops (table beets, carrots, peas, snap beans, sweet corn)

Margie Lund | 607-377-9109 cell | mel296@cornell.edu potatoes, dry beans, and post-harvest handling and storage

Judson Reid | 585-313-8912 cell | jer11@cornell.edu greenhouses/high tunnels, small farming operations, fresh market vegs

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Cornell Cooperative Extension Cornell Vegetable Program

For more information about our program, email cce-cvp@cornell.edu or visit CVP.CCE.CORNELL.EDU

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