



## Maine Tree Fruit Newsletter

Sunday, July 12, 2020 Vol 27:9

### Fire blight

This year has the most extensive fire blight infections of the last 30 years. Even so, most orchards do not have much fire blight at this point, either because the grower sprayed streptomycin before the strong infection period on May 29-30, or because fire blight inoculum or number of open blossoms was too low for infection potential. However even in locations with little apparent fire blight, there is likely more fire blight in the woods near the orchard than in the past years. This could result in shoot blight showing up even in orchards that did not have blossom blight infections earlier.

If you find fire blight strikes, ideally they should be removed as soon as possible. But restrict cutting to dry weather. The question about the need to sterilize blades between cuts seemed to have been settled several years ago when research found that the advantage gained by rapid removal of strikes as soon as they became visible outweighed any advantage conferred by sterilizing blades between cuts (which slows sanitation pruning). The recommendation has always been to sterilize blades before reusing them for use beyond fire blight removal pruning.

This year researchers at Cornell University reported that preliminary (e.g. non-replicated) observations from last year that showed fire blight spread was reduced when blades were sanitized between cuts. And that while it is only a preliminary observation, that if possible it would be prudent to do so. However, given that the opposite conclusion was reached by replicated research trials elsewhere, it is important to recognize that those those preliminary observations did not evaluate the time cost and delay of sanitation pruning caused by blade sterilization. Nobody ever suggested that sterilizing blades between cuts would make fire blight worse, the question is whether it is worth the extra labor and delay in fire blight removal to do so. For that question, the conclusion that rapid removal outweighs the benefit from blade sterilization still stands – remove the fire blight as soon as possible. If the amount of pruning required is small enough that you can complete sanitation pruning with the added time cost of blade sterilization, do so. But if blade sterilization will add extra days duration of active fire blight infections in the orchard, it is better to get the sanitation pruning done as promptly as possible.

The Cornell preliminary observations from last also found reduced risk of spreading infection by using clean cuts instead of breaking off infected shoots. Cornell recommends removal of any trees where fire blight has reached the central leader.

The current warm, humid weather increases the spread of shoot blight. After the first wave of shoot blight is removed, it is common for more shoot blight to show up in the following weeks, but less than in the first wave. After a second round of cutting, the cycle can repeat, with more shoot blight showing up from week to week, but at diminishing intensity. It may be discouraging to see new strikes after you have worked hard to remove every visible strike in the orchard. But growers who have been through this process report that by keeping after it, the number of new strikes can be suppressed. It is also worth noting that trees looked hacked after fire blight sanitation pruning recover to the extent that it can be hard to notice the following year. As with any disease, reducing the amount of inoculum in the orchard is key to preventing new infections. In addition to reducing shoot blight infection, removing existing shoot blight reduces the amount of dead wood in the orchard that can support growth of black rot, white rot, and bitter rot fungi.

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The Penn State Tree Fruit Production Guide 2019-2019 gives the following guidelines to prioritize fire blight removal:

- “• Young orchards three to eight years old with just a few strikes are highest priority.
- Young orchards three to eight years old with severe strikes.
- Orchards with a few strikes.
- The “walk away” group: orchards with so many strikes that most of the tree would need to be removed; severe pruning can stimulate new growth that can become infected (lowest priority).
- If fire blight is to be pruned, use the “ugly stub” method by cutting branches between nodes and several inches away from the central leader or other branch union:
  - Two-year-old wood (and older) is more resistant to fire blight and can stop infection movement into the tree. Since the bacteria can travel inside the tree well ahead of the visible infection (up to several feet), make cuts 8 to 12 inches below the last signs of browning, leaving a 4- to 6-inch naked stub in two-year-old or older wood.
  - A canker will form in the stub, which can be cut off with the canker during the next winter.
  - Disinfecting pruning tools is ineffective for minimizing spread of the disease since the bacteria often are present internally in mature bark well in advance of symptom margins.
- When terminal growth stops, the spread of fire blight should also stop. The most important thing to do to control fire blight during the summer is to control sucking insects like aphids and leafhoppers.\*
- Applying streptomycin sprays within 24 hours after hail or a storm with severe winds to prevent new infections is also a good practice.”

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\* Note that potato leafhopper has been implicated in the spread of fire blight on apple trees, and pear psylla has been implicated in the spread of fire blight on pear trees

Sanitation pruning remains the main line of defense against shoot blight. As for spray materials, the primary tool is prohexadione-calcium (PCa), the active ingredient in Apogee and Kudos). PCa takes 10 days to show an effect on reducing spread of fire blight. The recommended period for application of PCa ends at 3 weeks of terminal budset. Terminal budset in Maine varies with location, growing conditions, and cultivar. But a typical date for Sanford to Bangor is around July 20. With terminal budset and natural reduction in shoot growth beginning soon, it is too late in the season to recommend use of PCa to suppress spread of fire blight.

The same may be true for the Plant Defense Inducers mentioned below. The recommended timing to begin applications of those materials is during bloom, with repeat applications in the early post-bloom period. But with a lag time for their effect to develop and natural resistance to shoot blight developing soon, the useful window for use of those materials this summer is closing soon if not already ended.

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Anna Wallis & Kerik Cox of Cornell University wrote the following in the June 29 Scaffolds Newsletter:

“• **Plant Defense Inducers (SAR/ISR products):** Products that induce natural plant defenses can be applied preventively as well. These products may take a week to have an effect and should be re-applied approximately every two weeks. Products currently on the market include Regalia (Marrone Bio Innovations), an extract of the plant *Reynoutria sachalinensis* or giant knotweed, Lifegard (Certis), a strain of *Bacillus mycooides*, and Actigard (Syngenta), the synthetically derived compound acibenzolar-S-methyl.

• **Coppers:** Metallic copper can be applied to reduce surface inoculum, protecting tissues from new infections. Unfortunately, it will not penetrate plant tissue or contact bacteria present within plant tissue. Therefore, it should be applied preventively to reduce the risk of shoot blight infections. However, there is a high probability of damaging fruit finish when using copper post-bloom.

• **No Antibiotics:** Streptomycin and Kasugamycin should NOT be applied UNLESS there is an immediate risk of shoot blight infection. ONLY apply antibiotics within 24 hours of a storm with driving winds or hail. These trauma events will cause damage to tissue, providing an entry point for the pathogen that may lead to shoot blight. REPEATED APPLICATIONS OF ANTIBIOTICS MAY LEAD TO ANTIBIOTIC RESISTANCE AND SHOULD BE AVOIDED.”

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**More about SARs.** From: J.-P.Métraux. 2013. Brenner's Encyclopedia of Genetics (Second Edition). 627-629 <https://doi.org/10.1016/B978-0-12-374984-0.01509-6>

“Systemic Acquired Resistance

The potential of plants to become resistant after an initial infection was described already in the first part of the twentieth century. Ross and Kuc provided the first quantitative descriptions on tobacco and cucumber. An initial infection on a lower leaf with a fungal, bacterial, or viral pathogen that is recognized by the plant leads to a long-lasting and broad protection against fungal, oomycete, bacterial, or viral pathogen in distal leaves and

independently of the nature of the first invader. These early studies provided a broad background for the general phenomenology of the process. Two forms of systemic defenses have been defined. Systemic acquired resistance (SAR) refers to systemic reactions taking place after a localized infection of leaves with a pathogen. Soil-borne microbes that colonize roots and have beneficial effects on plant growth can also induce systemic resistance mechanisms in leaves; this is termed induced systemic resistance (ISR). SAR and ISR have been shown to work under field conditions. The possible existence of a substance capable of activating SAR has spurred the search for synthetic activators of resistance for practical use in plant protection. DCINA (2,6-dichloroisonicotinic acid and its methyl ester) and later ASM (acibenzolar-S-methyl (S-methyl benzo[1,2,3]thiadiazole-7-carbothioate)) have been discovered, and ASM has been developed commercially under the name BION®, ACTIGARD™, and BOOST®.“

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The *2020-21 Crop Protection Guide* for Apples by the Ontario Ministry of Agriculture, Food and Rural Affairs lists materials to suppress spread of fire blight shoot blight, with these preliminary comments:

“Products do not have activity on infected shoots, but rather help prevent spread of bacteria to other susceptible tissue.

Prune out infected shoots where possible and apply preventative spray immediately after.”

**Cueva** - May cause russetting of light-skinned cultivars. Use a 0.8% solution if fruit is present. If concerned about sensitivity of fruit, test first on a small area. Reapply every 3–7 days if conditions favor disease development.”

**Double Nickel LC - Suppression only.** Reapply every 3–7 days if conditions favor disease development. Can be mixed with copper fungicides to improve control.

**Oxidate 2.0 - Partial suppression only.** For increased coverage, use with a registered non-ionic surfactant. Apply at first signs of infection or when conditions favor disease development. Reapply every 5–7 days as needed. Do not apply when temperatures are high (above 30°C [=86F]), prior to rain, and to heat- or drought-stressed trees.

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Note that slow drying conditions and acidic tankmix increase the chance of fruit skin phytotoxicity from summer copper application. The 2019-2019 Penn State Tree Fruit Protection Guide implies that the useful timing for Oxidate applications to suppress shoot blight ends about 30 days after bloom. That leaves copper and copper + Double Nickel as the remaining spray materials to suppress spread of shoot blight.

## Fire blight Streptomycin Resistance Testing

Cornell University is providing free testing of fire blight specimens for resistance to the antibiotic streptomycin that is used to prevent blossom blight infections. See instructions below to collect specimens with living fire blight bacteria that are required to do the testing. In addition to refrigerating a sample between cutting and sending, it is best to mail samples on a Monday or Tuesday so that they arrive before the weekend.

Samples should be mailed to:

Kerik Cox  
 Cornell AgriTech  
 15 Castle Creek Dr.  
 Geneva, NY 14456

**Sample information**

<b>Collector</b> Name _____ Phone _____ Email _____	<b>Grower</b> <input type="checkbox"/> <i>Same as Collector</i> Name _____ Phone _____ Email _____
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<b>Sample Date</b>	_____
<b>Cultivar</b>	_____
<b>Rootstock</b>	_____
<b>Location</b>	Farm Name _____ Block Name _____ Street Address _____ City, State _____ County _____ GPS Coordinates _____
<b>Planting</b>	Year planted _____ or Relative age: <input type="checkbox"/> newly planted <input type="checkbox"/> 5-20 years old <input type="checkbox"/> >20 years old System: <input type="checkbox"/> high density <input type="checkbox"/> semi-dwarf <input type="checkbox"/> old standard



**Instructions:**

It is only possible to isolate the bacteria (*Erwinia amylovora*) from fresh, active lesions, where healthy tissue meets the diseased tissue. i.e. the lesion margin.

**Sampling the Lesion Margin**

Collect samples that include about 3 inches of healthy tissue beyond the infected tissue, and include about 3 inches of infected tissue. Do not submit all the dead branch of the strike, this is often too long and can be cut back, as described. Do not collect entire branches or trees unless symptoms are unusual.

Protect samples from drying out prior to submitting them. If possible, refrigerate them. It is impossible to isolate fire blight bacteria from dead, dried out tissue.

If possible collect samples with visible ooze!



Fire blight strike on current shoot (photo courtesy of J. Carroll).

Healthy growth. Trim this down, leaving about three inches of healthy tissue.

Lower lesion margin. Cut at least three inches into healthy tissue, below the lesion.

The strike. Cut this back, leaving about three inches of infected tissue.



Optimal amount of plant material to collect (photo courtesy of A. Wallis).



Cornell University  
Cooperative Extension



## Other Pest Notes

Even with the all the fuss about fire blight, the other pests have not taken the year off, and still require attention. That said, other pest damage so far this year has so far not been remarkable.

### DISEASES

**Apple scab** control has been excellent, with just enough exceptions to show that even in a year with abnormally dry conditions during primary scab season, infection potential remained. In most of the cases where scab infection is extensive, timing or dosage errors explain what happened. In a couple of other cases, that is not so, but high inoculum from poor coverage in trees last year or unsprayed trees with a high scab population provide some explanation for poor control this year.

The dry conditions this spring should reduce pressure from **sooty blotch and flyspeck (SBFS)** fungi. As with apple scab, those fungi are still around and even with a late start, are accumulating the ca. 270 leaf wetness hours needed to go from beginning of infection to visible colonies on fruit skin. Fungicide applications at 2 to 3 three-week intervals (2 weeks for captan alone, 3 weeks for captan + Topsin, Flint, Sovran, or Pristine), are sufficient to keep SBFS in check. In addition, Luna Sensation and Merivon are effective against SBFS because they contain a strobilurin active ingredient.

Strobilurin applications are limited to four per season. A final strobilurin slot should be saved to apply Pristine in the final spray. It provides the longest lasting protection to prevent infections from starting early enough to become visible before harvest.

Hot days with temperature above 85F, and especially 90F, increase the risk of summer **fruit rots**, and sunburn – which also increase fruit rot risk. Most rot fungi require skin wounds to enter the fruit (bitter rot being an exception). Removal of dead wood and mummified fruit leftover from last year reduces rot fungi inoculum. Applications containing captan or other fungicides effective against SBFS work to reduce fruit rot (though Topsin M is weak against fruit rots). Calcium chloride applications also help suppress summer rot fungi (Biggs, A. R. 1999. Effects of calcium salts on apple bitter rot caused by two *Colletotrichum* spp. Plant Dis. 83:1001-1005)

### INSECTS and MITES

The next major pest on the horizon is apple maggot (AM). Using climatic average temperatures, apple maggot emergence would be expected to begin July 18, but June and July 2020 temperatures in central ME have been running a bit above average so AM emergence could begin slightly sooner, i.e. any day now. But first emergence does not mean spray coverage is required. It normally takes a week or more for enough AM to accumulate for protection to be needed. In addition, every orchard is unique with regard to the local AM population. Some orchards have high AM trap catches, other orchards have exceptionally low catches that never reach the treatment threshold. The only way to know your local AM population is to set traps.

For the first time in a long time, the UMaine – Maine Pomological Society Scouting Co-op is using odor baits with AM traps. This is sure to create trouble with growers with growers becoming alarmed by seeing trap counts much higher than they are used to. The odor baits

increase trap captures by about 5X, i.e. by 500%. The advantage from using the odor bait is that the higher trap captures with associated higher treatment threshold (5 AM per trap vs. 1 for unbaited traps) provides longer lead time for identifying when protection is needed.

The other regular pest at this time of year is European red mite (ERM). Counts in the Scouting Co-op blocks have been below threshold. The stretch of warm dry weather was ideal for ERM population growth. The arrival of more normal rain frequency is not only good for watering trees, it also supports the fungal diseases that help keep ERM populations from building.

With the transition to dwarf trees with small root systems and smaller leaf to fruit ratios, I have taken a precautionary measure to reduce the ERM treatment thresholds. The new guidelines are derived from research done in NY. But that research was done long enough ago that I am concerned that it does not reflect the sensitivity of high density, dwarf trees to ERM feeding. If I am wrong, the treatments thresholds below would be too low, but better safe than sorry.

**Procedure:**

- \* Collect 1-3 five leaves per tree from randomly selected trees throughout a block. Try to collect leaves from different sides, e.g. north/south, east/west.
- \* Choose only middle-aged leaves from the middle of fruit clusters or shoots. Do not collect the youngest or oldest leaves as they can give a biased count.
- \* Examine the top and bottom of each leaf with a magnifying lens.
- \* Count as infested only those leaves that have one or more moving hatched European red mites or twospotted spider mites. Mite eggs do not count toward the threshold.

<b>European red mite (ERM) sampling thresholds</b>			
<b>Far Below</b> = no treatment, can wait 2 weeks for next sample.			
<b>Below</b> = no treatment, sample again in 7 days			
<b>Above</b> = treatment recommended to reduce ERM population			

<b>JULY 1 – 31</b>			
Threshold is average of 2.5 living ERM nymphs or adults per leaf			
Corresponds to 60% of middle-aged leaves with ERM present			
Number of leaves sampled	Number of leaves with ERM present		
	Far Below threshold	Below	Above
30	0	8	27
40	4	16	31
50	6	22	37
60	8	28	42
80	13	40	54
100	24	59	60

<b>AUGUST 1 – 31</b>			
Threshold is average of 5.0 living ERM nymphs or adults per leaf			
Corresponds to 75% of middle-aged leaves with ERM present			
Number of leaves sampled	Number of leaves with ERM present		
	Far Below threshold	Below	Above
30	3	14	30
40	10	24	38
50	14	32	45
60	18	40	53
80	26	56	68
100	41	74	75



Note that pear leaves show an extreme reaction to mite feeding. Pear leaves can turn black overnight with just a few mites. Mite injury on pears can also look like dieback caused by fire blight.

And then there are the moths. Pheromone trap numbers are known to be questionable as damage predictors. I stopped trapping for codling moth several years ago because the trap counts did not align with damage. The pheromone traps capture male moths, not the females that lay eggs that hatch into fruit feeding larvae. But it is also true that there are published male pheromone trap captures. What I have seen over the years is that you can catch 20 CM per week per trap, which is far above the usual 5 CM per week per trap threshold, and there is not CM damage. I also stopped using them to identify start of the 1<sup>st</sup> flight. That is because individual traps have high variability due to variable population levels. The date for flight timing is a physiological estimate that should not depend on local population density. I was pleased to see that Washington state came to the same conclusion, and to also base CM flight timing estimates on degree accumulation. As for treatment thresholds, I took my concerns to the experts and they agreed that CM trap captures can exceed treatment threshold with no damage resulting. So what is the use of CM traps? Their answer is that IF the block has a history of CM damage, then watching the numbers in traps is useful to gauge the efficacy of mating disruption and to detect a rising CM population.

We put traps out this year to monitor CM. We will be moving them from the block perimeter to inside the orchard because CM traps on the perimeter can give a falsely inflated estimate. But even with moving the traps inside the orchard, I still expect above threshold trap captures per week in many if not most blocks. What does it mean? If you applied insecticide for plum curculio earlier, and will be applying insecticide for apple maggot in the coming weeks, my guess is ...not much.

The pheromone trap situation for Obliquebanded leafroller is even more problematic, as the OBLR males are strong fliers that can find their way into a trap from a long distance. Fortunately, for OBLR we can use shoot sampling to gauge the population of larvae. The optimum date for OBLR sampling is this week July 13-20 at Highmoor Farm and the central Maine area

## **Leaf and Soil Samples**

Leaf and soil samples can be collected in summer, the best time being the latter half of July. Avoid collecting leaf samples too early or too late. This can interfere with the readings and lead to over or under fertilization. Try to get the leaf tests collected between July 15 and 30.

Each leaf or soil sample must be accompanied by the Plant and Soil Analytical Lab form (enclosed). This information is used for your fertilizer recommendation. If leaves and soil are sampled from the same block, only one form is needed.

For more information on testing and costs for analysis, visit the UMaine Analytical and Soil Testing website at <https://umaine.edu/soiltestinglab/>

Leaf and soil samples can be sent directly to the Soil Testing Lab in Orono:  
Analytical Lab. & Maine Soil Testing Service  
5722 Deering Hall  
Orono, Maine 04469-5722

## Maine State Pomological Society Summer Mtg

The Summer Tour will be held in-person (not a Zoom meeting!) on Wednesday, July 22, at [Treworgy Orchards](#) in Levant ([3876 Union St, Levant, ME](#), between Newport and Bangor).

Registration is \$20, payable at the event. The event is designed to prepare apple growers for the fall harvest and marketing during the current pandemic. During the morning tour, there will be a grower discussion, moderated by Jason Lilley, UMaine Extension Sustainable Agriculture Professional, on methods that people are planning to keep farm staff and customers safe from the spread of Covid-19.

The afternoon program will feature the Maine Mobil Health who will talk about services offered for seasonal workers. We hope you can attend, but have to limit the total number to 50 people. Preregistration is required, so contact Margie Hansel to reserve your space (207) 829-6136 or email [mhansel@maine.rr.com](mailto:mhansel@maine.rr.com).

Due to Covid-19 restrictions, attendees will be expected to wear face masks during the welcome period, while getting lunch and anytime during close contact with others. Please, also bring chairs for the afternoon program. This will reduce contact between farm staff and guests.

Schedule (subject to change)

9:30am **Welcome and registration**

10:00 to 11:45am. **Orchard tours and grower discussion on how to manage a Pick-Your-Own during a pandemic, moderated by Jason Lilley.**

11:45 to 12:45pm **Pizza lunch**

12:45 to 1:30pm **Maine Mobile Health (<http://www.mainemobile.org/>) health care services available for seasonal workers and their families.**

1:30 to 2:00pm **Pest management issues in 2020, Glen Koehler**

2:00 to 2:30pm **Safe use of sanitizers in the workplace, TBD**

2:30 to 3:00pm **Controlling noxious orchard weeds, Renae Moran**

Attendance qualifies for 2 pesticide applicator recertification credits.

## Restricted Entry Interval Notification

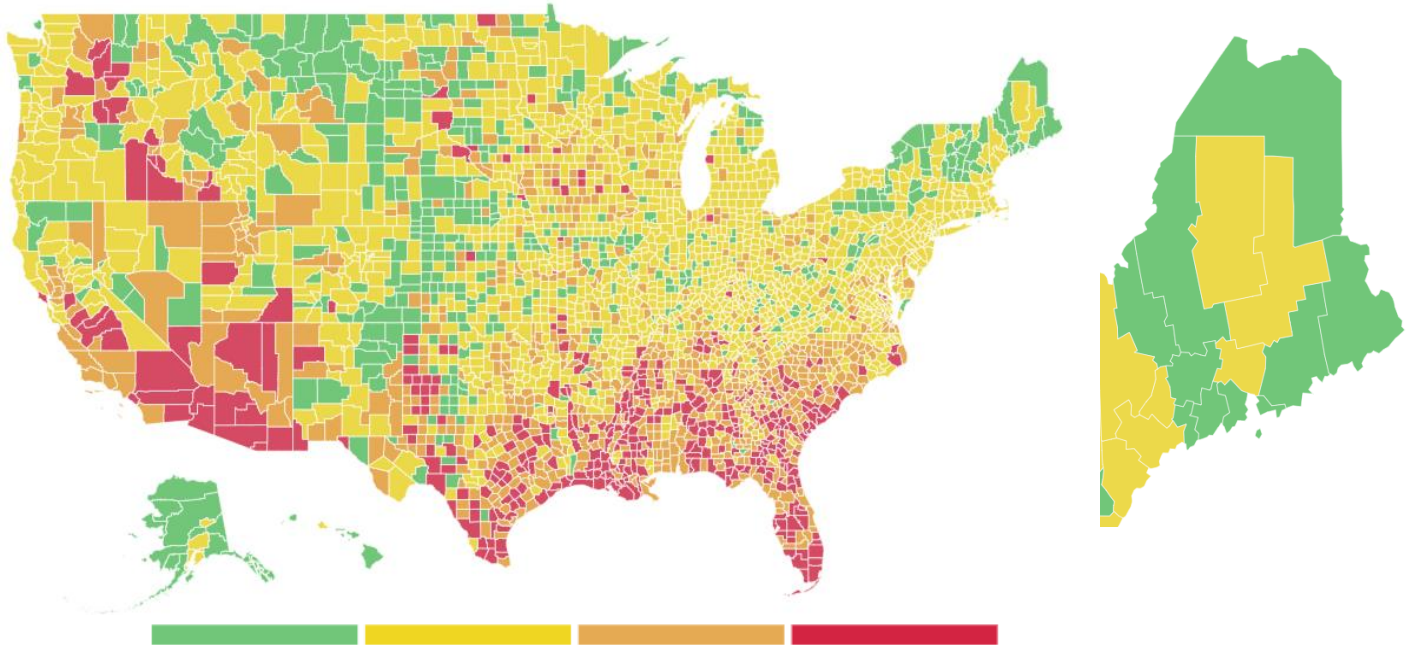
EPA regulations require the following for pesticide application warning signs:

- Post signs **24 hours or less before** the scheduled pesticide application.
- **Keep signs posted during application and throughout the REI (if any).**
- **Remove signs within three days after the end of the REI** or within three days of the application if there is no REI.
- Keep signs visible and legible while they are posted.

From: EPA - Pesticide Worker Safety: Notice to Workers About Pesticide Applications and Pesticide-Treated Areas. <https://www.epa.gov/pesticide-worker-safety/notice-workers-about-pesticide-applications-and-pesticide-treated-areas>

## Closing Words

This map displays COVID Risk Levels for each county in the United States. Hover over a county for detailed information on cases and deaths counts. Risk Levels are calculated based on daily cases per 100,000 population (7 day rolling average).



Risk Levels: Green Yellow Orange Red

**Green** = <1.0 new cases per day per 100,000 population, **Yellow** = 1 to <10, **Orange** = 10 to < 25, **Red** = >25

Aroostook County, ME	0.0	Waldo County, ME	1.1
Kennebec County, ME	0.0	Penobscot County, ME	1.3
Sagadahoc County, ME	0.0	Oxford County, ME	1.5
Knox County, ME	0.4	Piscataquis County, ME	1.7
Franklin County, ME	0.5	State level	1.8
Hancock County, ME	0.5	Androscoggin County, ME	2.0
Lincoln County, ME	0.8	York County, ME	2.1
Somerset County, ME	0.8	Cumberland County, ME	4.6
Washington County, ME	0.9		

Values as of July 9, 2020.

Graphics from: Harvard Global Health Institute.

<https://globalepidemics.org/key-metrics-for-covid-suppression/>

OH Dept. of Health: <https://www.youtube.com/watch?v=o4PnSYAqQHU&feature=youtu.be>

[Glen W. Koehler](#)

Associate Scientist IPM

Email: [glen.koehler@maine.edu](mailto:glen.koehler@maine.edu)

Voice: 207-581-3882 (within Maine: 800-287-0279)

Pest Management Office, 491 College Avenue

Orono, ME 04473-1295

<http://pmo.umext.maine.edu/apple/>



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[Dr. Renae Moran](#)

Extension Tree Fruit Specialist

Email: [rmoran@maine.edu](mailto:rmoran@maine.edu)

Voice: 207-933-2100 ext. 105

Highmoor Farm Ag. Exp. Station, P.O. Box 179

Monmouth ME 04259-0179

<http://extension.umaine.edu/fruit/>