

# Wisconsin Pest Survey Report

## FRUIT & VEGETABLE DISEASE SURVEY

In 2019 DATCP plant specialists visited 32 Community Supported Agriculture farms (CSA), community and immigrant gardens in the La Crosse, Madison, Milwaukee and Hudson areas on a biweekly bases, checking for vegetable diseases. Orchard pest experts from the IPM institute scouted 12 vineyards and 8 orchards for this collaborative survey that targeted a total of 17 diseases of special concern to agriculture in the state. Thankfully, none of the targeted new and invasive pathogens were detected in 2019. However, an abundance of rain and cold temperatures in the spring followed by more rain throughout the summer created perfect conditions for many bacterial and fungal pathogens to cause significant disease problems on vegetable and fruit crops.

### List of Fruit and Vegetable Survey Target Pathogens by Crop Host

None of the targeted pathogens were detected, with the exception of late blight (*Phytophthora infestans*).

Primary Crop Host(s)	Common Disease Name	Scientific Name of Pathogen	Detected Y/N
Tomato and pepper	Bacterial wilt and canker of tomato	<i>Clavibacter michiganensis michiganensis</i>	N
Tomato, pepper, potato,	Late blight of Tomato/Potato	<i>Phytophthora infestans</i>	Y
Tomato, pepper, potato,	PSTVd, TCDVd virus symptoms	<i>Potato spindle tuber and tomato chlorotic dwarf pospiviroids</i>	N
Onion, garlic, bulb flowers	Stem and bulb nematode	<i>Ditylenchus dipsaci</i>	N
Cucurbits	Downy mildew of cucurbits	<i>Pseudoperonospora cubensis</i>	N
Cucurbits	Cucumber green mottle mosaic (CGMMV)	<i>Tobamovirus Cucumber green mottle mosaic virus</i>	N
Corn	Java downy mildew	<i>Peronosclerospora maydis</i>	N
Corn	Philippine downy mildew	<i>Peronosclerospora philippinensis</i>	N
Strawberry/Asian pear	Asian pear blight	<i>Erwinia pyrifoliae</i>	N
Apple	Apple proliferation	<i>Candidatus Phytoplasma mali 16SrX-A</i>	N
Apple	Virus symptoms	Apple mosaic virus (ApMV)	N
Apple	Apple crown and root rot	<i>Phytophthora sp.</i>	N
Apple	Marssonina blotch	<i>Marssonina coronaria</i>	N
Grape	Australian grapevine yellows	<i>Candidatus Phytoplasma australiense 16SrXII-B</i>	N
Grape	Flavescence doree	<i>Candidatus Phytoplasma vitis 16SrV-C</i>	N
Grape	Boir noir, Stolbur	<i>Candidatus Phytoplasma solani 16SrXII-A</i>	N
Grape	Pierce's disease	<i>Xylella fastidiosa</i>	N

**POTATO AND TOMATO LATE BLIGHT:** There was a significant increase in late blight pressure during the 2019 season. This disease was reported in 18 counties in 2019 compared to only 4 in 2018. The state's first infected commercial potato fields were confirmed by the UW Plant Pathology Department in Wood County on July 17. The next find in the state came from a CSA tomato field in La Crosse County as part of DATCP's Fruit and Vegetable survey. DATCP's Plant Industry Laboratory (PIB lab) confirmed late blight on tomatoes in four counties: La Crosse, Polk, Pierce and St. Croix. UW Plant Pathology reported that all 2019 late blight isolates were US-23 pathogen genotype, which has not developed resistance to phenylamide fungicides such as mefenoxam.



Tomato leaves and fruit with late blight symptoms.



**TOMATO DISEASES - *Septoria* leaf spot and stem blight** was ubiquitous on tomatoes throughout the state. Twenty-three of 35 (66%) sample submissions were infected with *Septoria*. Early blight (*Alternaria solani*) was found as early as July 1 in Polk County with more detections in August in Portage and Pierce counties. Leaf mold (*Fulvia fulva*) was detected in hoop house grown tomatoes from La Crosse County.



Fulvia leaf mold on Tomato

**PEPPER** - Bacterial diseases caused significant problems on peppers, leading to bacterial spot (*Xanthomonas vesicatoria* or *X. euvesicatoria*) and syringae seedling blight and leaf spots (*Pseudomonas syringae*) on 10 of 14 (71%) samples submitted to the PIB lab. Bacterial spot is a serious problem on peppers causing lesions on fruit and stem which renders the fruit unmarketable. In addition, major crop losses result from the shedding of blossoms and young, developing fruit. Cultivars with resistance to bacterial spot are available. Seed can be also treated with hot water according to the UW "Commercial Vegetable Production in Wisconsin" publication A3422. *Syringae* leaf spot is a less serious disease that affects only the foliage. New growth may be healthy once growing conditions become warmer and drier. Differentiation of bacterial pathogens does require lab testing.



Tomato with bacterial fruit spot disease (*Xanthomonas spp.*)



Alternaria fruit rot on peppers

**POSPIVIROIDS** - Potato spindle tuber viroid (PSTVd) and tomato chlorotic dwarf viroid (TCDVd) are of concern to Wisconsin exporters of pepper, potato and tomato seed. These viroids are highly transmissible by seed and by touching infected plants. All twenty-eight samples from Dane, Kewaunee, La Crosse and Polk counties tested negative for these viroids.

**BASIL DOWNY MILDEW:** This disease was confirmed in four counties: Dane, La Crosse, Sheboygan and Waukesha; covering the whole width of the state. The Dane and La Crosse County finds were detected by DATCP's Fruit and Vegetable survey. The Sheboygan and Waukesha County finds were reported by the UW Plant Pathology Department. Basil downy mildew (BDM) spreads via wind-dispersed spores, rapidly infecting entire fields and causing complete plant loss. BDM is often present on greenhouse-grown basil in garden centers in the spring though it may not progress until late summer. Purchasing disease-free plants, promoting airflow, and frequent monitoring of the crop so harvest can occur quickly once mildew symptoms appear are all important controls. The use of fungicides for BDM control is not recommended.



**CUCURBIT - CUCURBIT DOWNY MILDEW:** Cucurbit downy mildew (CDM) was first diagnosed on August 20 in Dane County by the UW Plant Pathology Department, with subsequent detections in Buffalo and Vernon counties. This aggressive foliar disease produces no direct symptoms on cucumber fruits, but increases the risk of sunscald, causes secondary fruit decay, and reduces photosynthetic activity. Cucurbit downy mildew spreads into the northern U.S. in summer on airborne sporangia from infected plants in other states. Nationwide forecasting and reporting of CDM can be found at <http://cdm.ipmpipe.org/>

The DATCP Fruit and Vegetable survey found common diseases such as anthracnose (*Colletotrichum orbiculare*) on cucumber, bacterial leaf spot, angular leaf spot (*Pseudomonas sp. / Xanthomonas sp.*) and downy mildew on squash and pumpkins. Lab testing showed that cucumber green mottle mosaic virus (CGMMV), a disease of concern for crop exporters, was not present in any cucurbit samples submitted.

**ALLIUMS** - Four of six samples of onion, leek and garlic were infected with purple blotch (*Alternaria porri*) from La Crosse Co. Garlic rust was observed on two garlic submissions from Dane Co.



Garlic leaves with rust pustules

**CABBAGE-** Wet conditions were very conducive for bacterial infections on broccoli, cauliflower, kale, kohlrabi and red cabbage. Six of 13 (46%) cole crop samples from Dane, La Crosse, Pierce and Washington counties were infected with black rot caused by *Xanthomonas campestris*.



Black rot symptoms on Lacinto Kale



Black rot symptoms on red cabbage

**STRAWBERRY** - Conditions were also right for strawberry leaf spot development on strawberry plants. Strawberry leaf spot (*Mycosphaerella fragariae*) was detected in La Crosse, Pierce, and Sauk counties. Severe infections can cause leaves to drop, plant stunting or death. Besides using resistant varieties, disease control includes mowing after fruiting to remove disease inoculum and fertilizing to increase plant vigor.



Strawberry leaf spot

**GRAPE** - Grape anthracnose (*Elsinoe ampelina*), downy mildew (*Plasmopara viticola*) and powdery mildew (*Uncinula necator*) were confirmed on vines from Brown, Dane, Outagamie, Richland, Vernon and Trempeleau counties. Vineyards were surveyed by collaborators from the IPM Institute as part of DATCP's Fruit and Vegetable survey.



Grape downy mildew

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