

Ohio Vegetable & Small Fruit Research & Development Program

Final Report

2017

Project Title: Vegetable and Fruit Disease Diagnosis

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Why was this project funded? This diagnostics project is primarily a service to commercial vegetable and fruit growers in Ohio. We request funding each year to help support the OSU Vegetable and Fruit Pathology Laboratories' efforts to assist growers in diagnosing crop diseases, particularly in the case of unusual or difficult-to-diagnose cases, and diseases that have explosive potential and require early detection on a regional scale.

Project outline: We utilize a range of traditional and modern, state-of-the-art diagnostic methods. These include light microscopy to identify fungal and oomycete (*Phytophthora*, *Pythium*, downy mildew) pathogens based on morphology, culturing followed by microscopic or other identification, biochemical and plant tests for bacterial identification, serological assays, mainly for virus and bacterial identification, specific polymerase chain reaction (PCR) assays and genomic sequencing. When a sample is received by courier, US mail, or in person, it is immediately catalogued and given a unique number. After initial evaluation, the submitter is contacted within 24 hours by phone or email, and provided with a preliminary diagnosis and management recommendations. In many cases this is also the final diagnosis. If culturing or other time-consuming tests are required, results may not be available for several days to several weeks.

Take-home messages: The vegetable and fruit diagnostic program provided timely information on the arrival of important diseases of vegetable, small fruit, tree fruit and hop crops throughout Ohio. Information on the diseases and their management was then provided to growers and the general public on the Ohio Veggie Disease

News blog (u.osu.edu/miller.769), the VegNet Newsletter (vegnet.osu.edu), Twitter (@OhioVeggieDoc), Ohio Fruit News (OFN; <https://u.osu.edu/fruitpathology/fruit-news-2/>), the fruit pathology Facebook page (@fruitpathology), the Ohio Grape IPM Facebook page (@ohiograpeipm), and directly to county Extension educators.

Impacts:

1. The estimated cost of providing this service to growers, considering labor and supplies, is \$60 per sample. In 2017 we diagnosed 448 fruit and vegetable samples. Therefore, the value of this service in 2017 to Ohio fruit and vegetable growers is \$26,880. **This represents a 7:1 return on grower’s investment in this project.**
2. One new fruit disease and one new hop disease were observed in Ohio during the 2017 growing season: blackberry downy mildew and Hop stunt viroid disease. The identification of these new diseases in the state has led to the initiation of two new applied research projects.

Vegetable Sample Final Report

What was discovered? A total of 367 samples were diagnosed in 2017; the majority of the samples were submitted by or on behalf of commercial vegetable producers in Ohio.

Sources of the vegetable samples are shown in **Figure 1**.

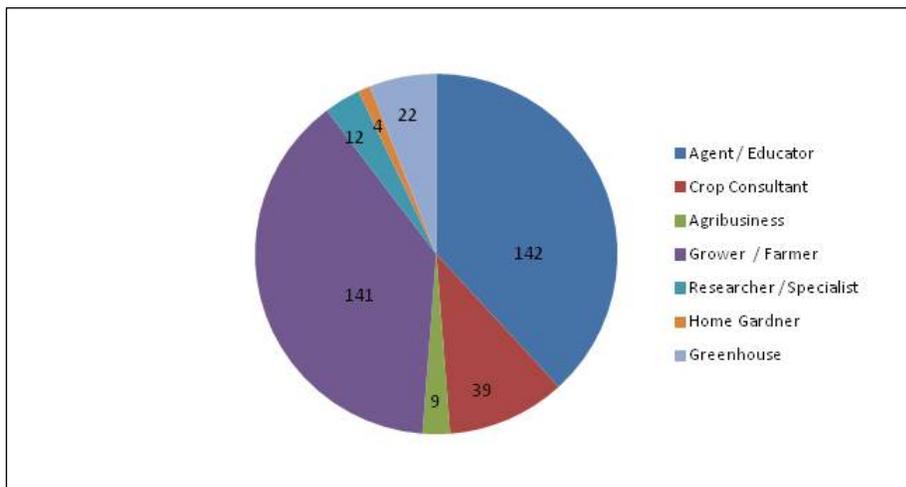


Figure 1. Sources of samples submitted to the OSU Vegetable Pathology Laboratory during 2017.

Vegetable samples were received from 39 Ohio counties and four counties in other states (**Figure 2**). The number of counties for this year is similar to 2016 (42

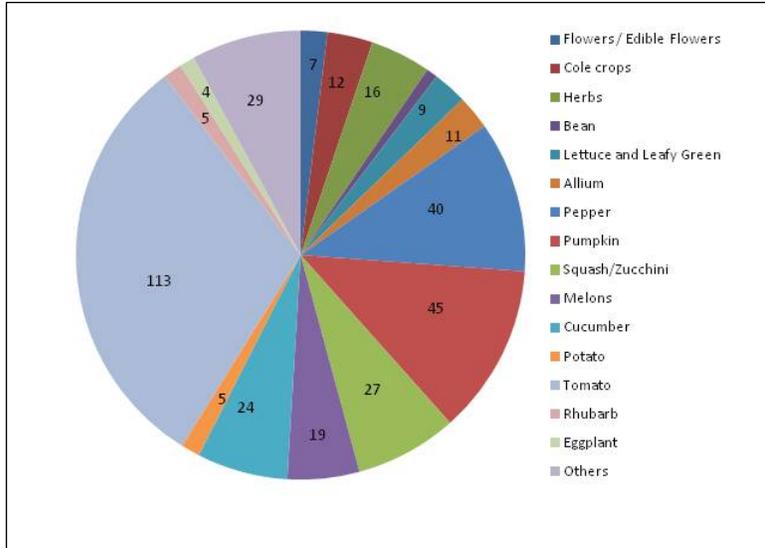


Figure 3. Number of samples received for diagnosis by the OSU Vegetable Pathology Laboratory in 2017 by crop type.

We pinpointed the first appearance of downy mildew in cucumbers, melons, pumpkins and squash in 11 counties in the state. All first reports were submitted to the multistate cucurbit downy mildew forecasting site (Cucurbit ipmPIPE; <http://cdm.ipmpipe.org/>). Downy mildew was also reported on basil, lettuce, anise and mustard.

Bacterial diseases were extremely severe (83 samples). Cucurbits were the most affected crop (24 samples with angular leaf spot, eight samples with bacterial wilt, and six samples with bacterial leaf spot). We also received at the beginning of the growing season (May-June) an unusually high number of tomato plants with herbicide damage (10 samples).

Fruit Sample Final Report

What was discovered? During the 2017 growing season we received 78 fruit samples from 21 counties. Nearly 50% of the samples were from Wayne county (46.1%), followed by Tuscarawas (6.4%), Knox and Ross (5% each), Ashtabula and Stark (3.8% each), and Athens and Cuyahoga (2.6% each) counties (**Figure 1**). Fruit samples, number of samples, counties from which the samples were received, and sample diagnosis for the 2017 growing season are summarized in **Table 1**.

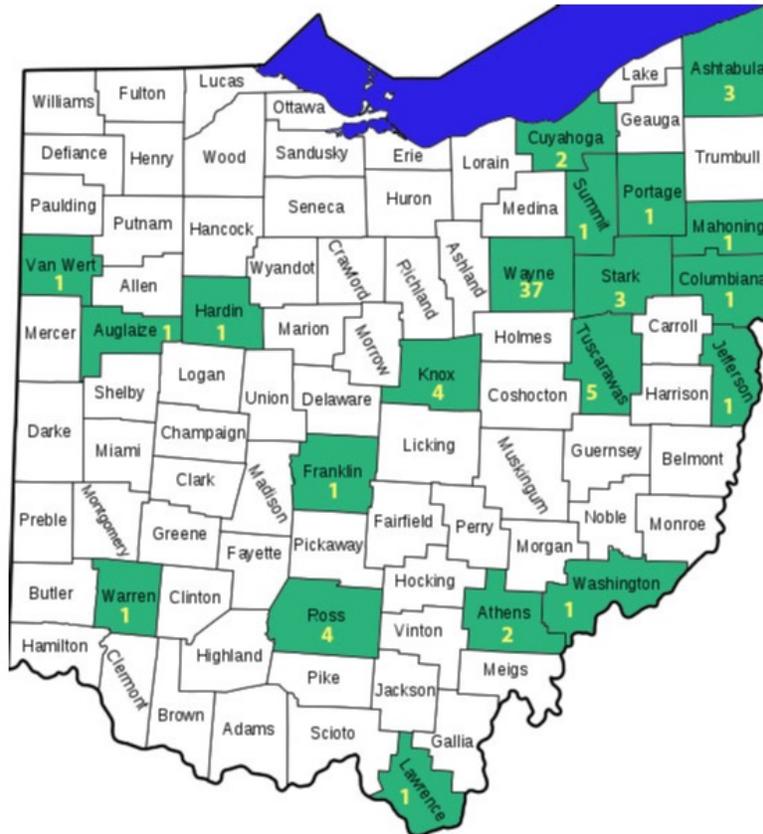


Figure 1. County map of Ohio showing the county (colored green) with the number of fruit samples that were submitted to the Vegetable and Fruit Disease Diagnostic Lab in 2017 from that county.

One quarter (25.6%) of the samples were apples, followed by grape (17.9%), peach and plum (16.7%), (brambles (12.8%), hop and strawberry (8.9% each), blueberry (5.1%), cherry (2.6% each), and other (1.3% each) (**Figure 2**). The other category included fig, ornamental fruit and banana. Overall small fruit samples (including grape) represented 42% percentage and tree fruit samples represented 44.9% percentage of the samples received in 2017.

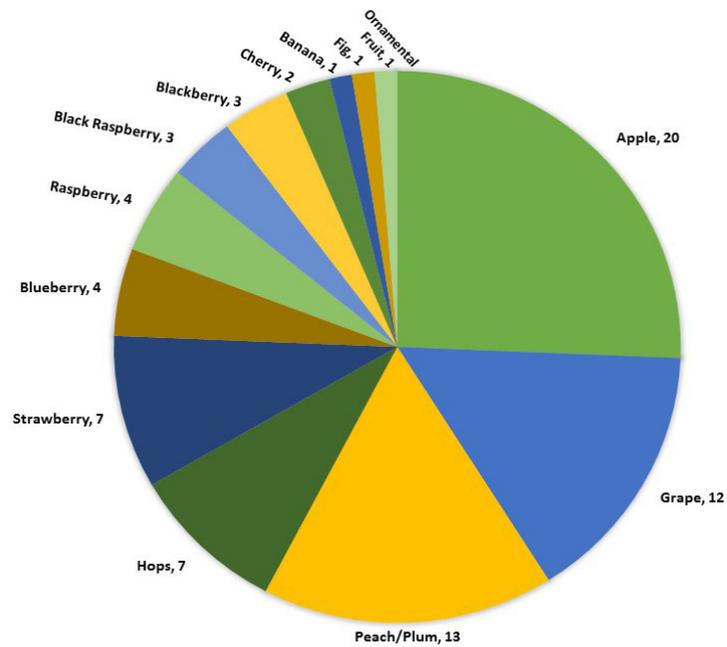


Figure 2. Number of fruit samples received for diagnosis by the Vegetable and Fruit Disease Diagnostic Lab in 2017 by crop type.

Table 1. Summary of fruit samples, number of samples, counties from which the samples were received, and sample diagnosis for the 2017 growing season

Crop	Disease	Number of Samples	County
Apple	Apple scab	1	New York
	Bitter rot	2	Wayne
	Black rot	2	Wayne
	Brown rot	1	Hardin
	Fire blight	3	Wayne
	Phytophthora root rot	1	Union
	Flyspeck and Sooty blotch	1	Knox
	Insect damage (unknown sucking)	1	Wayne
	Nutrient deficiency	1	Wayne
	White rot	1	Wayne
	Undetermined	6	Wayne
	Banana	Anthracnose (<i>Colletotrichum musae</i>)	1
Black Raspberry	Anthracnose (<i>Elsinoe veneta</i>)	1	Auglaize
	Phytophthora root rot	1	Wayne
	Anthracnose and Phytophthora root rot	1	Jefferson
Blackberry	Orange rust	1	Wayne
	Downy mildew	1	Wayne
	Sunburn (scald)	1	Wayne
Blueberry	Putnum scale	1	Warren
	Undetermined	3	Wayne
Cherry	Cherry leaf spot	1	Wayne
	Insect damage (Cherry leaf mine and aphids)	1	Stark
Fig	Abiotic	1	Knox
Grape	Black rot	2	Ashtabula, Athens
	Cold damage	1	Not reported
	Crown gall	1	Wayne
	Diaporthe dieback	1	Illinois
	Downy mildew	2	Washington
	Herbicide damage	1	Ashtabula
	Phytophthora root rot	2	Ross
	Sunburn (scald)	1	Ashtabula
Undetermined	1	Athens	

Crop	Disease	Number of Samples	County
Hops	Abiotic	1	Wayne
	Hops stunt viroid disease	1	Summit
	Potato leaf hopper	1	Wayne
	Undetermined	3	Van Wert, Cuyahoga
	Verticillium wilt	1	Wayne
Ornamental Tree	Cedar apple rust	1	Wayne
Peach/Plum	Bacterial canker	1	Stark
	Brown twig rot	1	Wayne
	Copper toxicity	1	Tuscarawas
	Herbicide damage	1	Wayne
	Insect damage	4	Tuscarawas, Stark, Mahoning
	Peach leaf curl	1	Wayne
	Peach scab	1	Knox
	Phytophthora root rot	1	Wayne
	Undetermined	2	Tuscarawas, Wayne
	Raspberry	Phytophthora Root Rot	3
Undetermined		1	Ross
Strawberry	Abiotic (moisture fruit cracking)	1	Wayne
	Anthracnose crown rot	1	Wayne
	Black rot	2	Columbiana, Franklin
	Unidentified fungal fruit rot	1	Lawrence
	Unidentified fungal leaf spot	1	Wayne
	Phytophthora root rot	1	Portage
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