Ohio Vegetable & Small Fruit Research & Development Program Final Report

2025

Project Title: Vegetable and Fruit Disease Diagnosis

Principle Investigator(s): Francesca Rotondo., Melanie Lewis Ivey, Andres Sanabria- Velazquez

Other Key Personnel: Therese Miller

Phone Number: 330-263-3721 (FR), 330-263-3849 (MLI),

Fax: 330-263-3841

E-mail: rotondo.11@osu.edu, Ivey.14@osu.edu . Sanabria-velazquez.1@osu.edu

Cooperating Institution: The Ohio State University

Mailing Address: Department of Plant Pathology, 1680 Madison Ave., Wooster, OH 44691

Why was this project funded? This diagnostics project primarily serves commercial vegetable and fruit growers across Ohio. Each year, we request funding to support the efforts of the OSU Vegetable and Fruit Pathology Laboratory in assisting growers with the diagnosis of crop diseases, especially those that are unusual, difficult to identify, or pose a significant threat due to their rapid spread and need for early regional detection.
In 2022, the C. Wayne Ellett Plant and Pest Diagnostic Clinic (OSU CWE PPDC) was integrated with OSU's fruit and vegetable diagnostic programs and relocated to Selby Hall on the CFAES Wooster Campus. The consolidated program now operates under the leadership of Dr. Francesca Rotondo.

Project outline. We received 320 physical samples, including 123 from fruit production and 195 from vegetable production, all from open-field systems. Most samples were processed using traditional diagnostic methods such as microscopy, culturing, and moist chamber techniques. Immunoassays were used to detect viral diseases like Tospoviruses and oomycete pathogens such as *Phytophthor*a, *Phytopythium,* and buckeye rot.

We continued using the digital diagnostic approach introduced in 2020 during the COVID-19 lockdown.

Each sample, whether received digitally, by courier, mail, or in person, was cataloged and assigned a unique number. After initial evaluation, submitters were contacted within 24 hours by phone or email with a preliminary diagnosis and management recommendations. In many cases, this served as the final diagnosis. When culturing or other time-intensive tests were required, final results could take several days to one week. Samples are typically processed within 24 hours of arrival. Microscopic examinations and immunoassays often allow for preliminary results within this timeframe. Final identification, based on culturing and further microscopy, can take up to 48 hours for bacterial diseases and 7–10 days for fungal pathogens. Molecular diagnostics were applied to confirm species identification for specific pathogens

Take-home messages.

Samples are typically processed within 24 hours of receipt, allowing preliminary results through microscopy and immunoassays within the same day. Final identification may take up to 48 hours for bacterial diseases and 7–10 days for fungal pathogens.
Molecular diagnostics were applied to confirm pathogens such as Xanthomonas species (bacterial leaf spot) and Colletotrichum spp. (anthracnose).

Findings from the diagnostic clinic were shared directly with growers and through multiple platforms:

- Ohio Fruit News (https://u.osu.edu/fruitpathology/fruit-news-2/)
- OSU Fruit and Vegetable & Specialty Crops Newsletter (https://u.osu.edu/vegnetnews/)
- Monthly Muck Breakfast, Willard, OH
- Fruit Pathology Facebook page (@fruitpathology)
- Weekly meetings with Extension educators

Impacts. In 2025, we diagnosed a total of 346 physical samples and 25 digital samples. The cost of providing the basic service to growers, considering labor and supplies has increased significantly increased over time, about $70 per physical sample. This does not include the cost of advanced diagnostics necessary in some cases or overhead costs. We estimate that the cost of diagnosing electronic samples is $20/sample.
Therefore, the value of this service in 2025 to Ohio fruit and vegetable growers is at least $24,7000 ***This represents a 4.2:1 return on grower's investment in this project.***

Sample Type	Commodity			Estimated Value ($)
	Vegetable	**Fruit**	**Ornamental cut flowers**	
Physical	195	123	28	$24,220
Electronic	15	10	0	$500
Total	**207**	**87**	**18**	**$24,700**

What was discovered?

This year has been marked by unusual weather conditions, including heavy rains at the beginning of the growing season, followed by hot, humid weather and a prolonged period of drought with sporadic rainfall throughout the summer. These fluctuations have led to an increase in sample submissions, particularly for bacterial diseases such as soft rot in onions, *Phytophthora* in cucurbits and peppers, and buckeye rot in tomatoes.
Elevated temperatures and humidity have also contributed to the emergence of diseases typically confined to high tunnels, such as pith necrosis and leaf mold, now appearing in open field tomato production.

Strawberry samples were primarily affected by crown pathogens such as *Neopestalotiopsis*, *Colletotrichum* and *Phytophthora*. The black root rot fungal complex was also commonly found associated with the roots. Apple leaf blotch, caused by *Diplocarpon coronariae* (formerly *Marssonina caronaria*) has been reported in several orchards causing severe defoliation and consequently yield losses. The fungal disease is favored by rainy and cool weather conditions, these conditions maynegatively impact the timing and the efficacy of fungicide applications.

Vegetable Diagnostic

Samples for different commodities (Figure 1) were submitted directly by growers or by OSU extension educators on behalf of growers from the counties reported in Table 1.

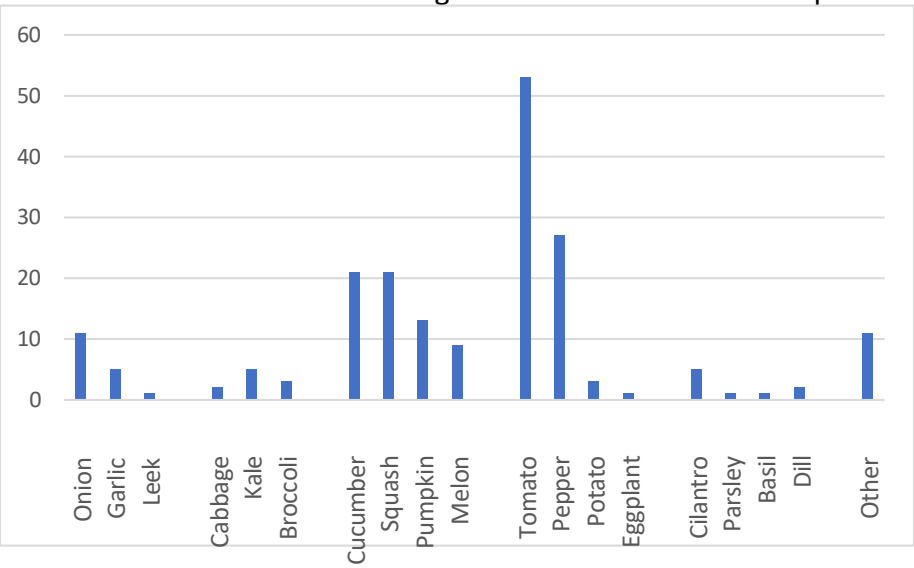

Figure 1. commodities submitted

Table 1. Counties that have vegetable sample submitted for diagnostic

County	Sample Count	County	Sample Count
Wayne	65	Hamilton	2
Butler	36	Columbiana	2
Huron	21	Clark	2
Sandusky	17	Brown	2
Holmes	11	Muskingum	1
Morrow	9	Madison	1
Ottawa	7	Logan	1
Medina	6	Knox	1
Franklin	6	Henry	1
Hardin	5	Hamilton	1
Wood	4	Greene	2
Seneca	4	Fulton	1
Montgomery	4	Cuyahoga	1
Washington	3	Champaign	1
Pike	3	Ashtabula	1
Washington	2	Ashland	1
Putnam	2		
Loraine	2		
Highland	2		

Fruit Diagnostic

Samples from different commodities (Figure 2) were submitted directly by growers or by OSU extension educators on behalf of growers from the counties reported in Table 2.

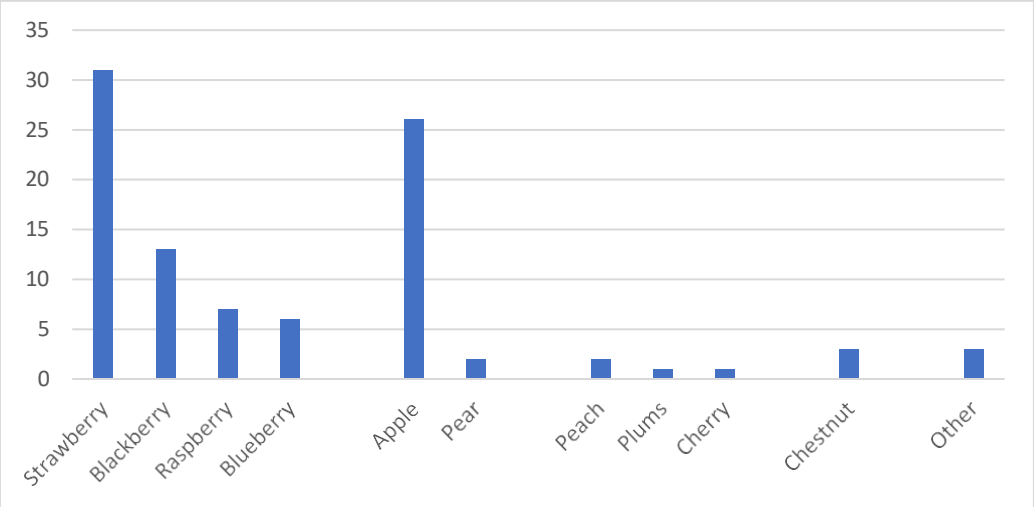

Figure 2. Commodities submitted

Samples from different commodities were submitted directly by growers or by OSU extension educators on behalf of growers from the counties reported in Table 1.

Table 2. Counties that have fruit samples submitted for diagnostic

County	Sample Count		County	Sample Count
Wayne	36		Medina	2
Franklin	8		Huron	2
Holmes	6		Champaign	2
Licking	5		Washington	1
Sandusky	4		Warren	1
Fairfield	4		Ross	1
Columbiana	4		Pickaway	1
Pike	3		Ottawa	1
Lorain	3		Mahoning	1
Hardin	3		Lake	1
Erie	3		Greene	1
Montgomery	2		Brown	1
Monroe	2		Ashland	1

Cut Flower Diagnostic

Samples for different commodities (Figure 3) were submitted directly by growers or by OSU extension educators on behalf of growers from the counties reported in Table 3.

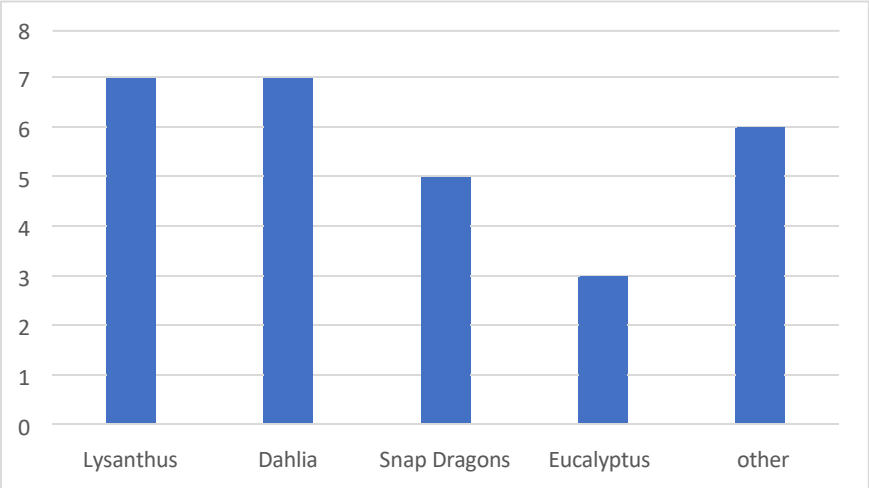

Figure 3. Commodities submitted

Table 3. Counties with samples submitted for Cut Flower Diagnostic

County	Sample Count
Franklin	10
Huron	5
Wayne	3
Ashland	2
Washington	1
Stark	1
Putnam	1
Montgomery	1
Holmes	1
Hardin	1
Greene	1
Delaware	1

Overall, prompt diagnoses and management recommendations are essential for growers. The research grants allow growers to access these services free of charge, and the diagnostic data generated form the foundation for developing new grants aimed at studying and characterizing emerging pathogens, as well as their biology and management, for both fruit and vegetable crops. In addition, the diagnostic data provides an overview of which diseases are present, offering state specialists the opportunity to develop research that focuses on pathogens of greatest concern and those most frequently observed.