

# Washington Blueberry Commission Research Proposal

**Title: Bacterial Canker on Blueberry**

**Year Initiated: 2024   Current Year: 2024   Terminating Year: 2026**

**Principal Investigator:**

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**Cooperator:**

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**Justification and Background:** *Pseudomonas syringae* pv. *syringae* is a bacterium that multiplies in blueberry buds and on expanding aerial plant tissues as an epiphyte during the late fall and into the spring months. The disease is called bacterial blight or bacterial canker and is well known to the industry. The pathogen is rarely isolated from asymptomatic tissues during dry weather but can be isolated from symptomatic, diseased tissues year-round. The disease is favored by the presence of overwintering inocula in diseased stems and buds on plants in the field. The disease is also favored by large epiphytic populations of the pathogen on the surface



of emerging tissues in the early spring months. Wounded tissues provide entry sites for the pathogen into the plant. Wounds can be caused by pruning, insects, hail, wind, and frost injury. Disease incidence and severity in the spring is often greater following frost injury from the previous fall. Many isolates of *P. syringae* can catalyze the formation of ice crystals at elevated temperatures such as 2°C and lower.

Bacterial canker can be particularly severe on young plants in new plantings because a high proportion of the wood is succulent and susceptible to disease. The bacteria can be

disseminated by wind, rain, and insects, or introduced with infested propagation wood and



nursery stock. Only canes produced in the previous season are attacked. A water-soaked lesion first appears on canes in January or early February and rapidly becomes a reddish-brown to black canker. Cankers may extend from a fraction of an inch to the entire length of the 1-year-old cane. Buds in cankers will be killed. If the stem is not girdled, buds above the canker can still grow. If girdled, the cane portion above the canker dies. Leaves turn orange and wilt if death occurs after buds have leafed out.

Two things have made bacterial canker a much more significant problem. First, the widespread development of copper resistance by *P. syringae*. Dr. Virgina Stockwell, then an OSU plant pathologist, now a USDA ARS plant pathologist, surveyed

populations of the disease and found copper resistance to be widespread in northwest Washington and documented resistance in the disease in eastern Washington where it was not previously known to occur and no copper had ever been applied for its control. Second, recent advancement in blueberry varietal development has produced several varieties that have been or are being planted by growers that contain southern highbush genetics including Draper, Calypso, Liberty, Elliot and the new Driscoll varieties. Draper and Calypso are two of the most widely planted blueberry varieties in Washington in the last ten years. These varieties appear to be especially susceptible to bacterial canker, particularly in the first three years. In northwest Washington, Calypso growers are losing about one year's growth out of three due to bacterial canker.

Some coppers appear to have better activity against bacterial canker than other copper bactericides such as Cueva and Badge, the latter of which is thought to be more effective due to the oxychloride content of the molecule. Further, there has been very little effort put into screening products for controlling this disease. There have been a number of new products registered on blueberries that have not been tested against copper resistant bacterial blight in Washington. Schreiber has successfully screened Badge against the disease on blueberry.

We propose to conduct two *P. syringae* efficacy trials in western Washington looking at conventional and biological products as well as selected copper bactericides. The first trial would start during early bloom and or expansion of leaf buds. The second trial would take place in early autumn when the rains begin, and leaves are dropping. Dr. Stockwell has agreed to collaborate and will assist with product selection, timing of applications and development of use patterns. Input will be collected from the affected members of the blueberry industry.

**Relationship to WBC Research Priority(s):** This project directly addresses priority number 4 of the WBC request for proposals.

- Development of new non copper alternatives for control of bacterial blight.

**Objectives:** Screening products for control of bacterial blight in suspect blueberry varieties.

**Procedures:** The two trials will take place in non bearing blueberries so finding trial sites is easy. There are plenty of trial locations in Skagit and Whatcom counties that have problems with bacteria canker, probably 50% of the acres planted in the last five years in Whatcom County has been to Calypso. The biggest question is how to limit the number of products that could be included. Products that have been shown to work on copper resistant *P. syringae* are Cueva and Badge. A program of Cueva tanked mixed with Lifegard significantly reduced the disease in a study in western Oregon. Tanos, although not registered on blueberries, has been used successfully against the disease on raspberries. Aliette, azoxystrobin, mefenoxam, and chlorothalonil are conventional fungicides that are supposed to have activity against *P. syringae* but have not been screened against the disease in Washington. Biological products with claimed activity include Vacciplant, Actinovate, Timorex, a host of hydrogen peroxide, phosphorous acid and all of the Bacillus products. The number of entries into this trial could be significant. Since this would be done in non bearing blueberries, it is not a crop destruct trial.

A recent conversation with Dr. Stockwell indicated that a fall application might be the most effective timing for trial initiation however, a second timing in the spring may have value.

**Describe how this research will benefit Washington blueberry growers:**

Washington blueberry growers, particularly in western Washington and that have susceptible varieties are losing time and money due to raging uncontrolled bacterial canker. Identifying new products that control bacterial canker could provide significant value to Washington blueberry growers.

**Budget:** Depending on the results and successes/ failures of the 2024 field season, we believe this project will last three years or less.

	<b>2024</b>	<b>2025</b>	<b>2026</b>
<b>Salaries<sup>1/</sup></b>	\$ 5,000	\$ 6,755	\$ 6,755
<b>Time-Slip</b>	\$ 1,000	\$ 1,000	\$ 1,500
<b>Operations (goods &amp; services)</b>	\$	\$	\$
<b>Travel<sup>2/</sup></b>	\$ 800	\$ 1,000	\$ 1,000
<b>Meetings</b>	\$	\$	\$
<b>Other</b>	\$ 6,000	\$ 6,000	\$ 6,000
<b>Equipment<sup>3/</sup></b>	\$	\$	\$
<b>Benefits<sup>4/</sup></b>	\$ 1,750	\$ 2,362	\$ 2,363
<b>Total</b>	<b>\$14,550</b>	<b>\$17,137</b>	<b>\$17,137</b>

<sup>1/</sup>Type of Personnel, Agricultural Researcher

<sup>2/</sup> Travel to fields to collect samples

<sup>3/</sup> Other: the \$6,000 is for Dr. Walters to make the applications and counts.

<sup>4/</sup> Benefits 35%

The PI has submitted a proposal to the Washington Commission on Integrated Pest Management for \$16,000. We place a value of \$3,000 each or a total of \$6,000 on the two trial locations.