

Phomopsis Diseases of Blueberry

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Phomopsis twig and blossom blight and canker, caused by the fungus *Phomopsis vaccinii*, is a common disease of highbush blueberry in British Columbia (B.C.), particularly in the Fraser Valley. The disease originates as blighting of twigs and blossoms or cankers on stems, and later progresses into stem dieback and bush decline. These symptoms can lead to substantial yield losses and crop damage.

Symptoms

Phomopsis vaccinii infects young, succulent shoots and blossoms of all blueberry cultivars, particularly young, non-bearing plants (2-4 years old). Infected twigs turn brown to dark brown in colour, while blossoms quickly turn brown and then become blighted and shriveled (Figure 1A). In some cases, twig blight followed by premature colouring and dropping of young fruit can be observed (Figure 1B). The symptoms spread from infected blossom or twig down to the stem, resulting in the dieback, 'flagging' symptoms, of stem (Figure 2A), and infection of crown tissue. Infected stems often have a mottled pattern of green, healthy tissues, interspersed with brown discoloration just beneath the bark and browning of pith tissue (Figure 2B).

Most highbush blueberry cultivars grown in B.C. are susceptible to *P. vaccinii*. The cultivar 'Draper' seems to be more susceptible than others; however, a systematic screening program to identify blueberry cultivars resistant or tolerant to *P. vaccinii* needs to be conducted. Regardless of the cultivar, young, non-bearing plants are more susceptible to twig and blossom blight than mature plants in established fields, perhaps, because they are not being treated with fungicides during their early field establishment.

Disease Cycle

Diaporthe vaccinii, the sexual stage of *P. vaccinii*, does not appear to be involved in the disease. The primary cause of disease is through the production of fruiting bodies (called pycnidia) by *P. vaccinii*, which produces masses of spores called 'pycniospores'. Pycnidia that are produced on infected tissues late in the season overwinter without further developing until the spring. In the following season, the production of pycniospores is triggered by a combination of temperature, moisture and growth stage of the plant. The optimum number of spores are produced and released by the pathogen between bud-break and bloom stages, when wet weather is present, and dispersed by rain or irrigation water. Spores that land on plant surfaces germinate at

temperatures between 8 to 24°C but require over 56 hours for germination. This suggests that long periods of plant surface wetness are required for spore germination and infection.

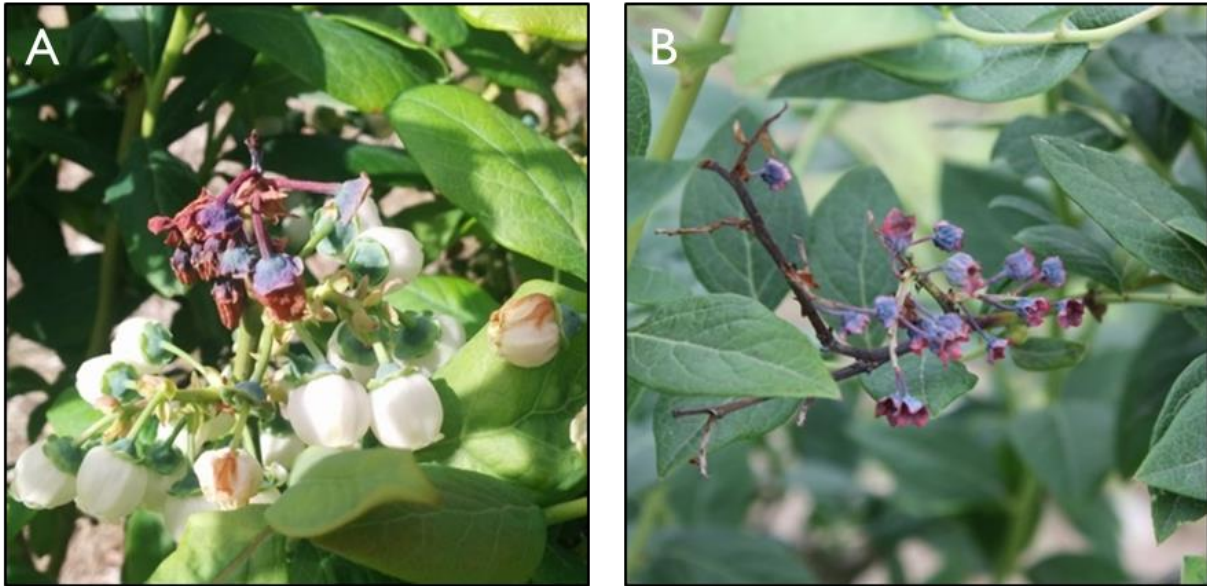


Figure 1. Blighting of blossom of cultivar 'Draper' (A) and blighting of twigs and premature colouring of green fruit and fruit drop of cultivar 'Aurora', infected with *Phomopsis vaccinii*.



Figure 3. Dieback and 'flagging' of stems (A), discolouration (mottling) of stem tissues beneath the bark (B) and browning of pith tissue (right) of cultivar 'Draper' infected with *Phomopsis vaccinii*.

Disease Management

Prevention

Prune adequately to maintain an open canopy and allow airflow to reduce plant surface wetness (leaf wetness) to minimize infection.

Avoid overhead irrigation in fields with a history of *Phomopsis* to avoid conidia dispersal, particularly from bud-break to bloom. If overhead irrigation is used, try to schedule irrigation early in the morning so that plants can dry quickly.

Prune out and remove all diseased branches at the end of the season to reduce the amount of inoculum (i.e. pycnidia), to minimize the infection in the following season.

Submit suspected plant samples to the [Ministry of Agriculture and Food - Plant Health Laboratory](#) or to a qualified laboratory for disease confirmation.

Chemical Control

Phomopsis vaccinii is most active in producing and dispersing conidia and causing infection under cool, wet weather early in the growing season, when blueberry plants are at bud-break to bloom stages. Therefore, timing of application of fungicides (Table 1) needs to be adjusted from year to year to correspond plant growth stages and weather conditions.

Follow a scheduled fungicide spray program, particularly for fields that have a history of *Phomopsis*. Even with a fungicide spray program, expected results may not be achieved under high disease pressure. Therefore, try to prevent/minimize the amount of inoculum and sources of infection in the field (see above under *Prevention*).

To prevent resistance development by the pathogen to fungicides, never apply a fungicide below the recommended rate, use fungicide at the highest recommended rate when disease pressure is high, and do not apply the same fungicide repeatedly or not for more than 2 consecutive sprays; rotate fungicides belonging to different chemical groups.

Table 1. A summary of registered fungicides and label information. Please refer to Health Canada's [Pest Management Regulatory Agency](#) website for fungicide label information.

Product name	Active ingredient	Chemical group	Mode of Action	REI ¹ h rs	PHI ² days	Application guidelines
Bravo 500 or 720, Echo 720	chlorothalonil	M	protectant (non-systemic)	48	54	Apply preventatively during green tip, pink bud and petal fall at 10- to 14-day interval. Do not exceed 3 applications per season.
Quash, Quash SC	metconazole	3	curative (systemic)	3	7-8	Apply preventatively during bloom and thereafter, at 10- to

						14-day interval. Do not exceed 3 applications per season.
Merivon	fluxapyroxad & pyraclostrobin	7 & 11	preventative & curative, locally systemic	12	0	Apply preventatively at 7 to 14 days intervals. Do not exceed 3 applications per season.
Pristine WG	boscalid & pyraclostrobin	7 & 11	protectant & curative (locally systemic)	24 or until dry	0	Apply preventatively during bloom and thereafter, at 7- to 10-day interval. Do not exceed 4 applications per season. Do not apply as a tank mix.
Cabrio EG	pyraclostrobin	11	protectant & curative (locally systemic)	24	1	Apply preventatively from early bloom and thereafter, at 10- to 14-day interval. Do not exceed 4 applications per season.
Allegro 500	fluazinam	29	protectant	24	30	Apply preventatively from early bloom and thereafter, at 10- to 14-day interval. Do not exceed 4 applications per season.
Aliette WDG	fosetyl-Al	33	protectant & curative (systemic)	24	1	Apply preventatively from pink bud and thereafter, at 14- to 21-day interval. Do not exceed 4 applications per season.
OxiDate	Hydrogen peroxide + acetic acid			4		Apply preventatively prior to onset of diseases or at symptoms expression and, thereafter, at 7- to 10-day interval. Do not exceed 8 applications per year.

¹REI - re-entry interval indicated on label ²PHI - pre-harvest interval

For Further Information

Polashock, J.J., Caruso, F.L., Averill, A.L. and Schilder A.C. Eds. (Revised 2007). Compendium of blueberry, cranberry and lingonberry diseases and pests. APS press.

Nabetani K., Wood B. and Sabaratnam S. 2017. Role of pycnidia in twig and blossom blight and stem dieback of highbush blueberry caused by *Phomopsis vaccinii* in British Columbia. Canadian Journal of Plant Pathology. 39:405-421. (DOI: 10.1080/07060661.2017.1375995).

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