BRITISH COLUMBIA | Ministry of Agriculture

Phomopsis Twig/Blossom Blight and Dieback

March, 2018

Phomopsis twig and blossom blight and dieback, 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, and later develops into stem necrosis and dieback. 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 1). In some cases, twig blight followed by premature colouring and dropping of young fruit can be observed (Figure 2). The symptoms spread from infected blossom or twig down to the stem, resulting in the dieback of stem and infection of crown tissue (Figure 3). Infected stems often have a mottled pattern of green, healthy tissue, interspersed with brown discolouration just beneath the bark and browning of pith tissue (Figure 4).

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 to *P. vaccinii* has yet 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 due to not being treated with fungicides during their early field establishment.

Figure 1. Blighting of blossom of cultivar 'Draper'.

Figure 2. Blighting of twigs and premature colouring of green fruit of cultivar 'Aurora'.

Figure 3. Dieback of infected stems of cultivar 'Draper'.

Figure 2. Discolouration (mottling) of stem tissues beneath the bark (left) and browning of pith tissue (right)

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 'conidia'. 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 conidia is triggered by a combination of temperature, moisture and growth stage of the plant. The majority of conidia 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. Conidia 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.

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.

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 spay 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 a fungicide,

- never apply a fungicide below the recommended rate
- use fungicide at the highest recommended rate when disease pressure is high.
- 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] hrs	PHI[2] days	Application guidelines
Bravo	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	metconazole	3	curative (systemic)	3	7	Apply preventatively during bloom and thereafter, at 10- to 14-day interval. 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	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	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	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.

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

For Further Information

- Berries Production Guide: Beneficial management practices for berry growers in British Columbia. British Columbia Ministry of Agriculture, Province of British Columbia. http://productionguide.agrifoodbc.ca/
- 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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