Wild Blueberry Fact Sheet

Septoria Leaf Spot and Stem Canker

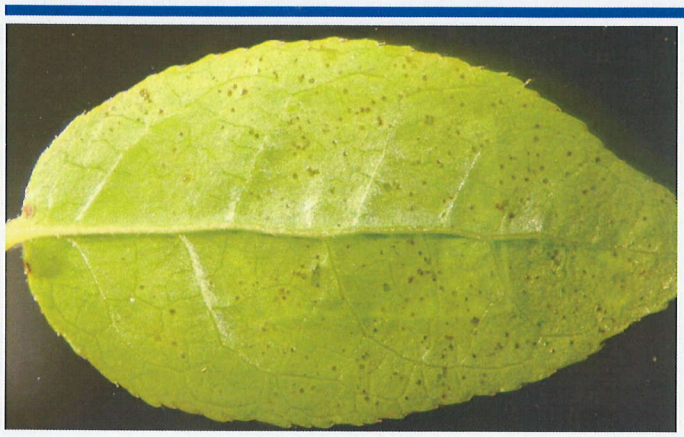

Figure 1. Early symptoms of infection by *Septoria* sp. showing minute water soaked spots on the undersurface of a blueberry leaf.

Figure 2. Advanced symptoms on undersurface of blueberry leaf infected with *Septoria* sp. Lesions range from individual small water soaked spots to larger areas where spots have merged.

Septoria leaf spot and stem canker is caused by a fungal species belonging to the genus *Septoria*. This disease can cause extensive spotting on leaves and stems and is associated with premature leaf and fruit drop. It occurs on both *Vaccinium angustifolium* and *V. myrtilloides*, the two host species that typically comprise commercial stands of lowbush blueberry. It occurs annually to varying degrees in most lowbush blueberry fields throughout eastern Canada and Maine.

Symptoms

In sprout fields, leaf lesions occur mostly on the lower leaves of stems while in fruiting fields, leaf lesions occur throughout the canopy. The lesions first appear in mid-late June as minute water soaked spots on the leaf undersurface and are visible only with a hand lens (Fig. 1). The spots are translucent with transmitted light. With time, the spots increase in number and size and become slightly raised and visible to the naked eye. The centre of a spot may become dark brown and slightly sunken while the outer edge remains water soaked and slightly raised. Tissues between lesions may become brown and lesions may be more pronounced along leaf veins. The leaf undersurface may have many lesions of different ages, and later in July, they begin to merge producing larger, irregular shaped spots that are variable in size up to about 5 mm in diameter (Fig. 2). The lesions penetrate to the upper leaf surface and appear as red/purple spots

with irregular borders. Symptom intensity and color of spots varies among clones. Leaves deep in the canopy may turn yellow instead of red/purple and appear peppered with the dark green water soaked spots. In sprout fields, the diseased lower leaves may drop during July and August (Fig. 3), but this often goes unnoticed because they are deep in the canopy. In the upper canopy of fruiting fields, the reddish/purple discoloration continues to intensify into late July and early August when affected clones take on an unhealthy reddish/brown appearance (Fig. 4). Clones may become severely defoliated by harvest time. By mid August, it is difficult to differentiate leaf spots caused by this disease from leaf rust, powdery mildew or other minor leaf spotting pathogens.

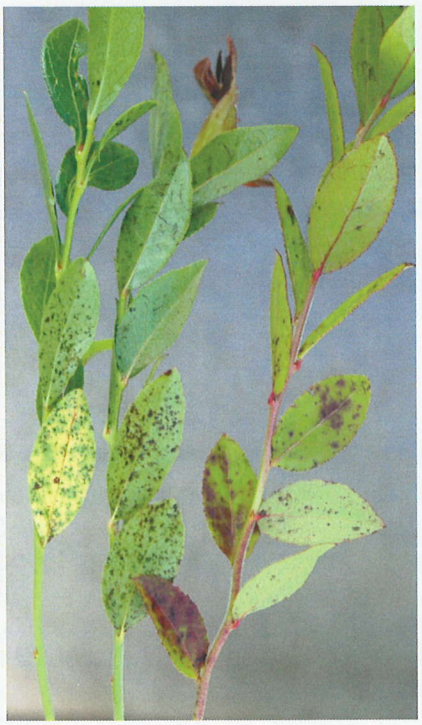

Figure 3. Leaf spotting, discolouration and defoliation caused by *Septoria* sp. on lower portions of lowbush blueberry sprout stems.

Figure 4. Symptoms of leaf spotting caused by *Septoria* sp. on upper surfaces of leaves from fruiting stems ranging from individual spots to larger diseased areas where spots have merged. Lesion size, number and color vary on clones and with age of infection.

Figure 5. Stem cankers with small fungal fruiting bodies (pycnidia) caused by *Septoria* sp. on a fruiting stem of lowbush blueberry.

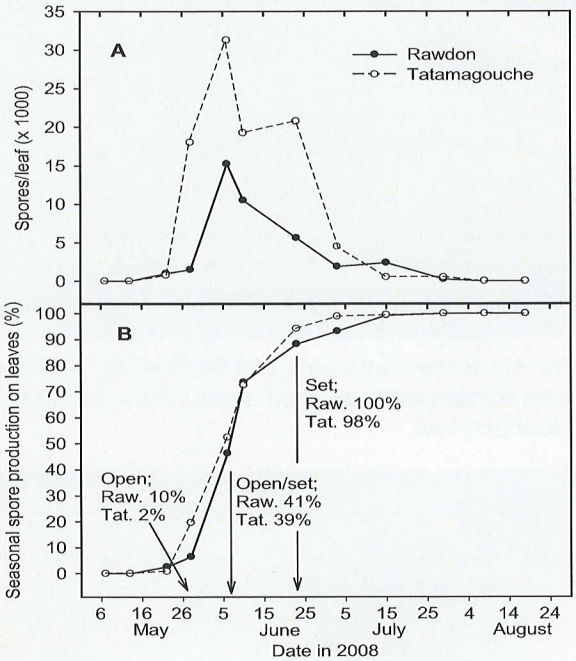

Figure 6. Example of seasonal spore production by *Septoria* sp. on infected, overwintered leaves in fruiting fields at Rawdon and Tatamagouche in 2008. A) Spores produced per leaf. B) Spore data are presented as cumulative seasonal spore production in relation to crop development; the percentages of open, open and/or set and set flowers are presented on the graph for each location. For example, at Rawdon and Tatamagouche, respectively, 100% and 98% of the flowers were set by June 23, and about 90-95% of the total spores from overwintered leaves had released by that time.

Lesions from infections in the sprout year also occur on fruiting stems and are easy to identify in late April-early May before the foliage develops. They initially appear as red/purple spots variable in size (0.5-10 mm long) and are confined to the lower half of the stem. They expand with time and by late May-early June the centres turn brown and become slightly sunken at which time they are referred to as cankers (Fig. 5). By late June, several cankers may merge causing much of the lower half of stems to be affected, but stems are usually not killed. This is in contrast to Godronia canker which causes lesions only at leaf nodes and kills stem tissues above the point of infection.

Disease Cycle

Small black fruiting bodies of the fungus called pycnidia begin to develop on diseased fallen leaves primarily in September and October and continue to mature during April and May of the following spring. Spore release occurs most intensively over a 3-4 week period beginning in late May in response to rain. In sprout fields, only those leaves and stem portions that have expanded during this time are exposed to spores explaining why the lower leaves of sprout stems become more severely diseased. The characteristic minute water soaked spots begin to appear on leaves about 10-14 days after infection, but do not become visible to the naked eye until about 4 weeks after infection. With time, the lesions intensify in number and expand and by mid to late July the leaves begin to drop if disease is severe. Although stem tissues also have been exposed to spores and become infected during this time, stem cankers do not develop until the following spring.

In the spring of the fruiting year, spore release from overwintered leaves follows the same seasonal pattern that occurs in sprout fields with most coinciding with the bloom period (Fig. 6). First spores are released when fruiting fields have about 1-10% open flowers and by the end of the bloom period, the majority of spores have been released. Spore production closely follows the bloom period regardless if the season is early or late. Release of spores from pycnidia in leaves and stem cankers occurs simultaneously every time rain occurs and spores are splashed onto the foliage. Infection of leaves occurs only on the undersurface. By mid to late July, severely diseased leaves begin to drop. Research is continuing on the effects of temperature and wetness duration in relation to infection.

In general, prolonged wet weather during June favours spore release and infection while subsequent prolonged hot dry weather causing moisture stress during July and August promotes drop of infected leaves and fruit.

Although some secondary pycnidia and spores may be produced on fallen, infected current season leaves, they are considered far less important than the primary pycnidia and spores that occur during late May and June. Secondary spores may occur in late July and August. The disease cycle is summarized in Figure 7.

Disease Management

Burn pruning after the fruiting phase of production can reduce this disease, but if conditions are highly favourable for infection during the subsequent sprout phase, then leaf and stem infections may still be high enough to result in high spore populations in the following fruiting year. In order for burning to reliably reduce this disease, it must be done intensively and uniformly throughout a field to destroy infected leaf and stem litter. Research has shown that fungicide applications during the spore release period (beginning at 1-10% bloom) can protect foliage from infection, but the decision to apply a fungicide may be difficult to make. In general, if premature leaf drop has been severe before harvest in previous years, fungicide applications may be beneficial in the current fruiting season. The percentage of stems with spots/cankers observed in early May of the fruiting year may also help to guide the decision whether to apply a fungicide. High numbers of affected stems indicate that infection was severe in the previous sprout year and that many cankers and overwintered leaves may produce high spore populations that pose a threat to the foliage of the current fruiting stems. Research has shown that attempting to control the disease with fungicides in the sprout phase does not appear to be cost effective. Pest management guides should be consulted for fungicide recommendations in the fruiting year.

Infection Cycle of *Septoria* in Lowbush Blueberry

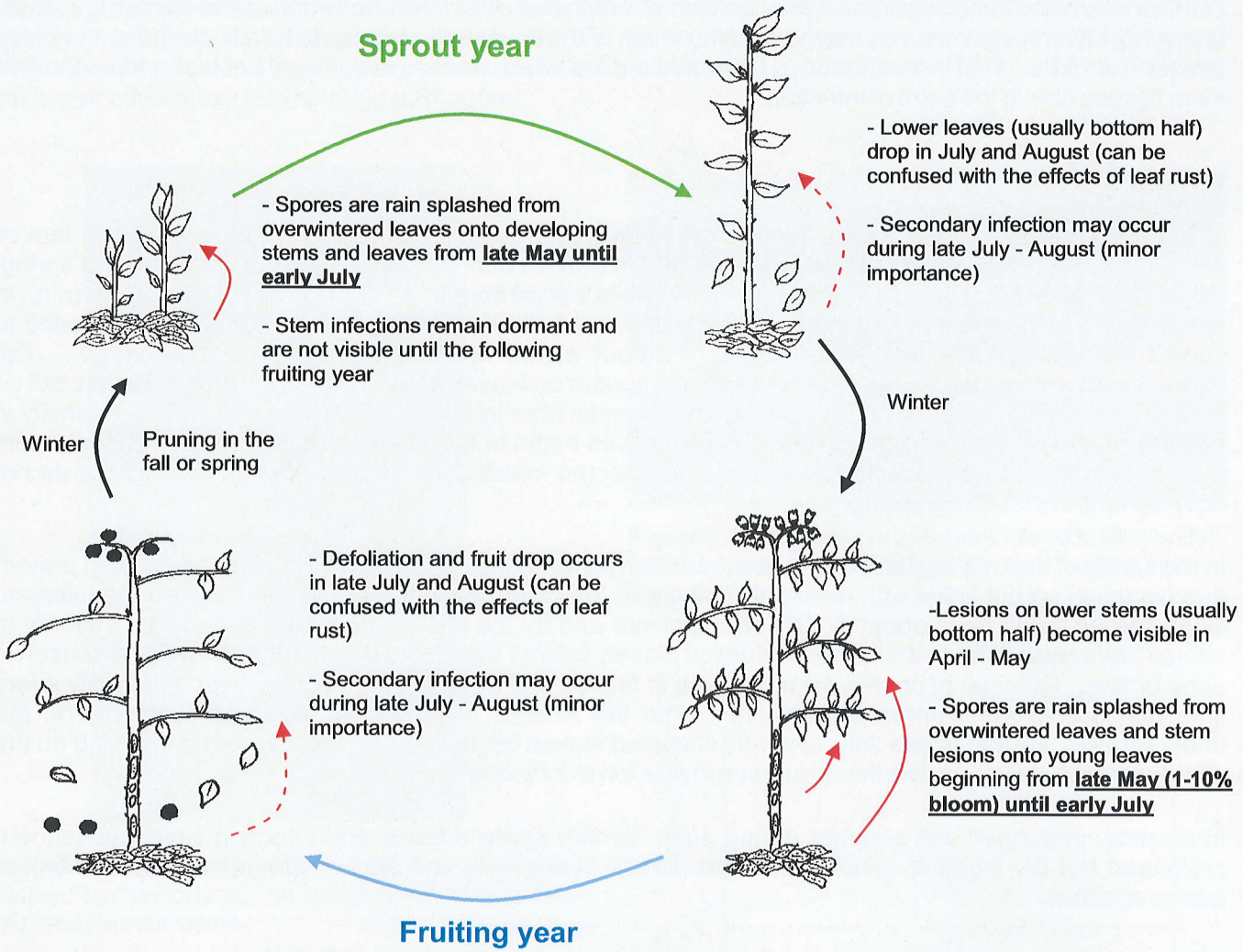

Figure 7. Infection cycle of *Septoria* sp. in lowbush blueberry.

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DELBRIDGE DISEASE MANAGEMENT

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Agra Point™

Canadian Wild Blueberry Industry Research & Development Institute Inc.
L'institut canadien de recherche et de développement de l'industrie du bleuet sauvage.