



Leaf Diseases of Wild Blueberry

Wild blueberries are infected by five major leaf diseases which cause leaf discoloration, leaf drop, reduced fruit bud production and lower yields. Septoria leaf spot, powdery mildew, leaf rust and red leaf are endemic to wild blueberry and can be found at some level in all fields. Valdensinia leaf spot was discovered for the first time in New Brunswick in 2006 and is currently found only in a few fields. The severity of leaf diseases is greater during wet seasons and less serious during seasons when the weather is dryer than normal. Powdery mildew however can be severe during dry seasons, causing early leaf drop on coarse drought-prone soils. When disease levels are severe in sprout (non-bearing) fields, yield potential can be reduced by 30 percent or more.

Septoria Leaf Spot (Septoria spp.)

The Septoria leaf spot fungi overwinter on leaves and stems infected during the previous season. The small, spore producing structures can be observed the following spring on both stems and old leaves. Under wet conditions, spores are produced as early as May and until late July, with the greatest release occurring in June. Spores are washed or splashed onto the newly emerging sprouts and leaves initiating new infections.

Leaf infections are first visible on the lower leaves as small water soaked blisters on the bottom-side of the leaf. Typically, there are many infections on a single leaf and individual infections can merge to produce larger infected areas which have tan to dark centers (A). On the upper leaf surface, these infected areas develop diffuse red margins. Infected leaves gradually turn chlorotic and significant leaf drop can occur by August on both sprout and cropping fields. Stem infections develop a dark, nearly black discoloration with red diffuse margins.

Assessing the impact of Septoria leaf spot on yield is difficult since it affects both sprout and cropping fields, usually in combination with other diseases such as powdery mildew and rust. In sprout fields, a fungicide application can be made in early June to suppress Septoria leaf spot development. Cropping fields could be treated at the early bloom stage, preferably with a fungicide or tank mixture that will also help control Botrytis blight. Since this disease overwinters on infected leaves and stems pruning by burning reduces disease pressure in the following year of sprout production. Good disease control in the sprout year may reduce the requirement for a fungicide application in the cropping year.



Powdery Mildew (Microspphaera vaccinii)

Powdery mildew can be detected in both sprout and cropping fields by mid June and there is a rapid increase in disease incidence during July and August. The fungus overwinters on leaves and stems infected during the previous season, but this disease may also be blown into the field from adjacent areas. Powdery mildew can become severe during dry years. Combined with other diseases, powdery mildew contributes to early leaf drop. On severely infected sprouts this disease may increase bud mortality during the winter. Fields with coarse soils that are prone to moisture stress are often more impacted by this disease.

The appearance of powdery mildew infection varies on different clones. Red specks and blotches are the most prominent symptoms (B). Some clones develop extensive white mycelium on the upper leaf surface while on other clones the mycelium is sparse and confined to the lower leaf surface. Since the mycelium is borne externally on the leaf, it is often washed off by heavy rains.

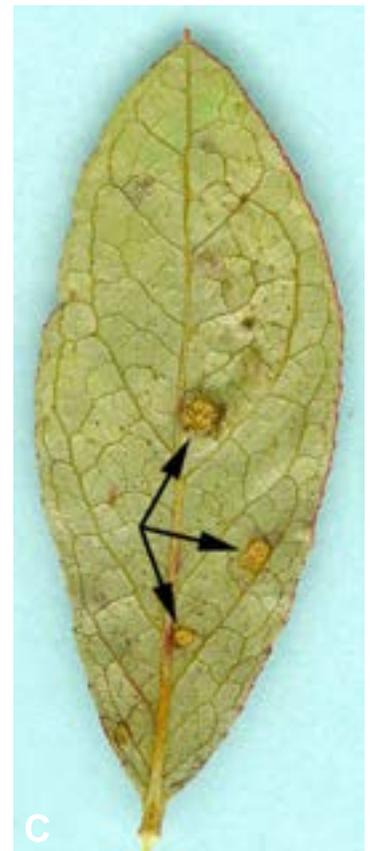
To date, there has been no evidence that pruning by burning decreases disease incidence. Powdery mildew can be effectively managed if the fungicides chosen for control of Septoria leaf spot and leaf rust also have good efficacy against powdery mildew.



Leaf Rust (Thekopsora minima)

Leaf rust has a complicated life cycle that includes several different spore types and infection of both blueberry and hemlock. Disease incidence in blueberry does not start to increase until mid July. Therefore rust has minimal affect on cropping fields which are typically harvested in August. It is, however, considered to be the major disease of sprout fields causing extensive leaf spotting and leaf drop.

Symptoms of leaf rust are similar to other diseases and consist of leaf spots with brown centers and diffuse red margins. This disease can, however, be distinguished easily from other diseases by examining the lower leaf surface for rust pustules (C). Leaf drop can be extensive by early September and the production of fruit buds in severely affected sprout fields can be reduced by 30 percent or more. Currently, a single application of fungicide in late July provides good control and suppresses both leaf infection and leaf drop. To date, there has been no evidence that pruning by burning decreases disease incidence and fields which do not have hemlock on their perimeter can still be severely affected by rust.



Red Leaf (*Exobasidium vaccinii*)

The red leaf fungus becomes established in the stems and rhizomes of the blueberry plant. Infected plants can therefore, remain diseased for many years. Most fields have a disease incidence of less than two percent but occasionally a higher disease level can be found. Infected plants produce little or no fruit, lack vigour and are frequently overgrown by healthy plants.

Leaves of infected blueberry plants turn red by midsummer and develop a white to cream colored growth of fungus spores on the lower leaf surface (D). These leaves darken during late summer and fall from the plant. The long term effect of pruning by mowing versus pruning by burning on this disease is not known. No fungicides are currently recommended for red leaf control but fungicides applied for other diseases may help suppress red leaf infections.



Valdensinia Leaf Spot (*Valdensinia heterodoxa*)

Valdensinia leaf spot was first found in New Brunswick in 2006 and is currently limited to a small number of fields. Based on observations of where the disease is first found in fields, it appears to be spread mainly by people and machinery. In one instance, however, Valdensinia was identified in uncultivated blueberries growing outside the field perimeter. Bunchberry, a common weed in blueberry, is also a host of this disease. For infection to occur, prolonged periods of cool wet weather are required.

Valdensinia is easily distinguished from other leaf diseases by the large size of the leaf spot which has a brown center and red margin (E). This disease can develop in June, with extensive leaf drop by July, if there are prolonged periods of wet weather. Defoliated sprouts initiate new vegetative growth that reduces fruit bud production. The Valdensinia fungus is also unique in that it produces an extremely large spore which is visible even without magnification. These spores and infected leaves cling to footwear and machinery and can be spread from field to field.



This disease overwinters on leaves infected the previous season. Therefore, pruning by burning is recommended for affected fields. Fungicides have been registered for Valdensinia management and should be applied in early June or when disease is first detected. Since this disease can be easily spread from field to field, growers should pay attention to field sanitation practices such as restricting access to fields and cleaning machinery prior to use.

Leaf Disease Management

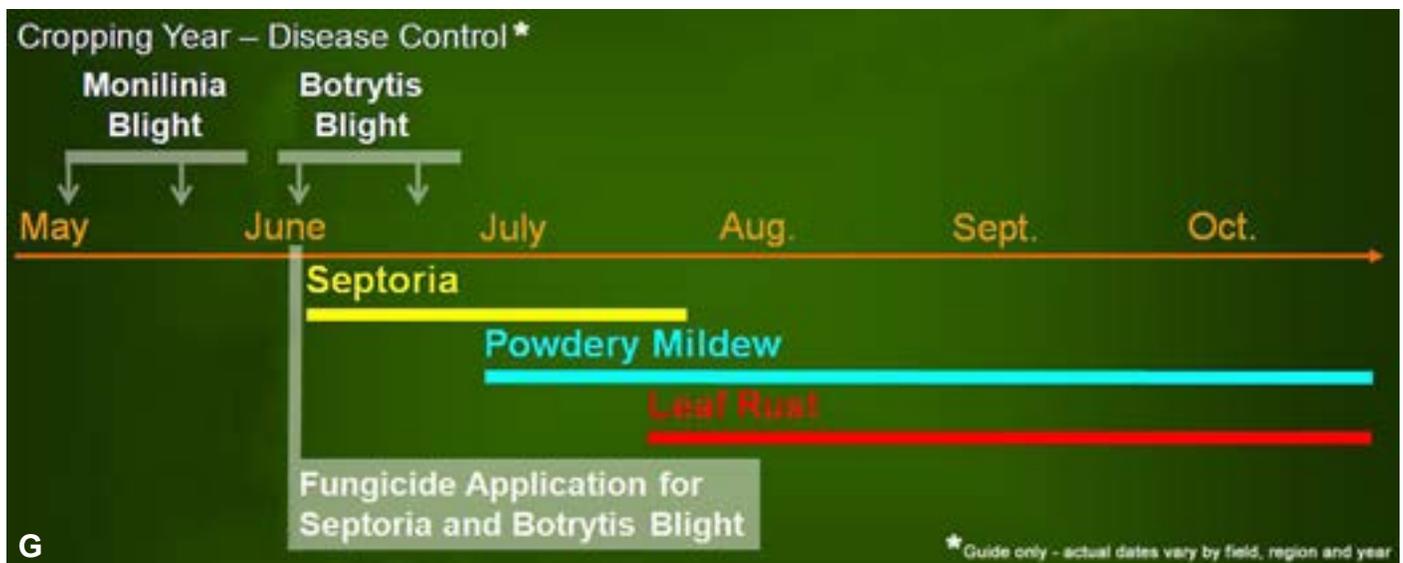
Land leveling of wild blueberry fields permits mechanical harvesting and the use of mowers for pruning. This has led to a decline in the use of burning to prune fields. Although there are negative aspects associated with burning, it is an effective production tool for the suppression of

diseases such as Monilinia blight, Botrytis blight, Septoria leaf spot, Valdensinia leaf spot and several insect pests. Some producers who prune primarily with mowers will occasionally prune by burning, specifically to reduce pest pressure.

Fungicides are also an effective management tool but timing and choice of fungicide are important. Blueberries are usually infected by more than one leaf disease; therefore it is best to develop a spray program that is effective on the entire leaf disease complex. In the sprout production year, applying a single spray in late July has been shown to significantly reduce disease severity. This fungicide should have good activity against leaf rust and also suppress powdery mildew. Applied in late July, this spray has little activity against Septoria leaf spot which occurs earlier in the season. A two-spray program in the sprout year would consist of a spray in early June with a fungicide effective against Septoria, followed by a July application for rust management (F). Controlling leaf diseases increases the number of fruit buds. To obtain a yield benefit producers must ensure that there are adequate pollinators for this increased production of bloom.



In the crop production year, some producers are applying fungicides for control of both Monilinia and Botrytis blights. When applying fungicides during bloom for Botrytis control choose fungicides that are also effective against Septoria leaf spot. While a single spray in early bloom may be adequate for Septoria suppression, two sprays may be required for good Botrytis control during wet seasons (G). Leaf rust and powdery mildew also affect cropping fields but most of the infections occur later in the season and are not believed to have a major impact on yield or quality.



For a list of products registered for the control of leaf diseases, consult the Wild Blueberry Pest Control Selection Guide. (<http://www.gnb.ca/0171/10/diseases.pdf>)

To view additional images of blueberry leaf diseases go to our Integrated Pest Management Images. (<http://daamaaextweb.gnb.ca/010-002/Default.aspx?Culture=en-CA>)