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Black Rot (*Xanthomonas campestris* pv. *campestris*)

Symptoms include yellowing at the leaf margin, which expands into the characteristic "V"-shaped lesion at any growth stage. The bacterium enters the plant through the hydathode (water pore) on the margin of the leaf; insect feeding, hail, or mechanical injury. The pathogen is seedborne. The bacterial infection often becomes systemic, entering the veins of the plant and spreading into the head. Blackening of the vascular tissue is typical in severe infections.



"V" shaped lesion progressing from leaf margin (left). Blackened vascular tissue of the stem (right)

Black Leg, Stem Canker (*Leptosphaeria maculans*)

Symptoms-Oval, sunken, light brown cankers, often with a black/purple margin, near the base of the stem. Cankers enlarge until the stem is girdled and the plant wilts and dies. Severely infected plants are stunted. Damping-off can occur if plants are infected at the seedling stage. Inconspicuous, circular, light brown to grayish spots form on leaves. The spots soon become well defined and develop ash-gray centers with large number of scattered minute black bodies (pycnidia). The presence of pycnidia distinguishes blackleg from other crucifer diseases.



Fungal pycnidia on leaf spots and on broccoli stem (left and center). Black leg girdling of stem (right)

Alternaria Leaf Spot (*Alternaria* spp.)

Symptoms-Yellow, dark brown to black circular leaf spots with target-like, concentric rings. Centers may fall out, giving the leaf spots a shot-hole appearance. Individual spots coalesce into

large necrotic areas and leaf drop can occur. Disease can spread by wind and rain, and favored by high relative humidity and temperatures ranging from 52-88°F.



Concentric rings with papery centers (left). Spots coalesced into large necrotic area (right)

Downy Mildew (*Hyaloperonospora parasitica*)

Symptoms-Sunken, angular greenish-yellow to light-brown lesions with fuzzy gray sporulation on the leaf undersides. The disease moves through the plant systemically, resulting in dark leaf petioles and dark streaks in broccoli heads. On mature cabbage and cauliflower, the infection may occur as dark sunken spots. The pathogen can survive in soils and plant debris; is spread by wind, rain and possibly by seed. Disease development is optimal at 50-60°F in humid conditions.



Pathogen sporulation on leaf underside (left). Close-up of fuzzy sporulation (right).

Powdery Mildew (*Erysiphe cruciferarum*)

Symptoms-White talcum-like growth on both leaf surfaces, starting as circular patches and expanding to cover the leaf. Leaves become pale green to yellow or tan, or if severely infected, curl and die. The plant is rarely killed, but growth can be stunted or defoliated. Low relative humidity with cool temperatures, water stress, and the availability of a thin film of moisture in which spores can germinate favor the disease. Spores easily spread by wind



Sclerotinia White Mold (*Sclerotinia* sp.)

Symptoms-Prominent white, cottony growth covering infected plant parts. Survival structures, known as sclerotia, which are about the size of mustard seeds, black, and resemble mouse droppings, develop on diseased tissue. Infected stems have a bleached, light gray, desiccated appearance. Initial lesions are small, circular, water-soaked and light green but rapidly increase in size. Affected tissues dry, turn brown, and may be covered with a white, cottony mycelium.



Copious white, cottony fungal growth on infect plant parts. Black sclerotia, resembling mouse droppings are visible (right).

Club Root (*Plasmodiophora brassicae*)

Symptoms-Struggling/stunted plants with deformed/galled roots. Crops with fibrous roots such as cabbage and broccoli produce club-like, spindle-shaped swellings on individual roots. Low soil pH of less than 6.5 and wet conditions favor this disease. Swimming spores move in water to infect plant roots. Resting spores can survive many years in the soil



Clubbed roots of kale (left) and rutabaga (right).

For help with disease and pest identification and management, contact the UVM Plant Diagnostic Clinic, 63 Carrigan Drive, Burlington, VT 05405

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<https://www.uvm.edu/extension/pdc>