

## Mycoleptodiscus Crown and Root Rot of Alfalfa: An Emerging Problem in Minnesota and Wisconsin

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During summer 2009, the University of Minnesota Plant Disease Clinic and the plant pathologist in the USDA-ARS Plant Science Research Unit in St. Paul received several samples of alfalfa plants with severe crown and root rot from southeastern Minnesota and southwestern Wisconsin. The disease, identified as *Mycoleptodiscus* crown and root rot, was observed in new plantings and established stands. Although the disease has been known since the 1950's, it has not caused severe problems in alfalfa production fields. It is not known if the weather pattern in 2009 caused an increase in observation of the disease or if the disease is becoming a bigger issue in alfalfa production. Be sure to watch for this disease over the next few years.

### Symptoms

Field symptoms consist of patches of plants that are stunted and yellowed with poor forage production. The patches may expand yearly. Plants dug from these patches have few lateral and fibrous roots. The remaining lateral roots may be black and rotted. Crown branches may be rotted off, leaving one to a few areas for shoot production. In the interior of the crown, brown decayed material extends from the crown into the taproot. The margin of the rotted area is often black. The black margin and presence of black sclerotia (resting structures) in the root and on the surface of the rotted crown is diagnostic. A hand lens or microscope is needed to see sclerotia. In controlled environments, the disease develops more rapidly at higher temperatures. Therefore, symptoms will likely be more visible during mid- to late summer. The pathogen also causes damping-off of seedlings at high temperature (~30°C), which is rarely seen in the upper Midwest.

### The Pathogen

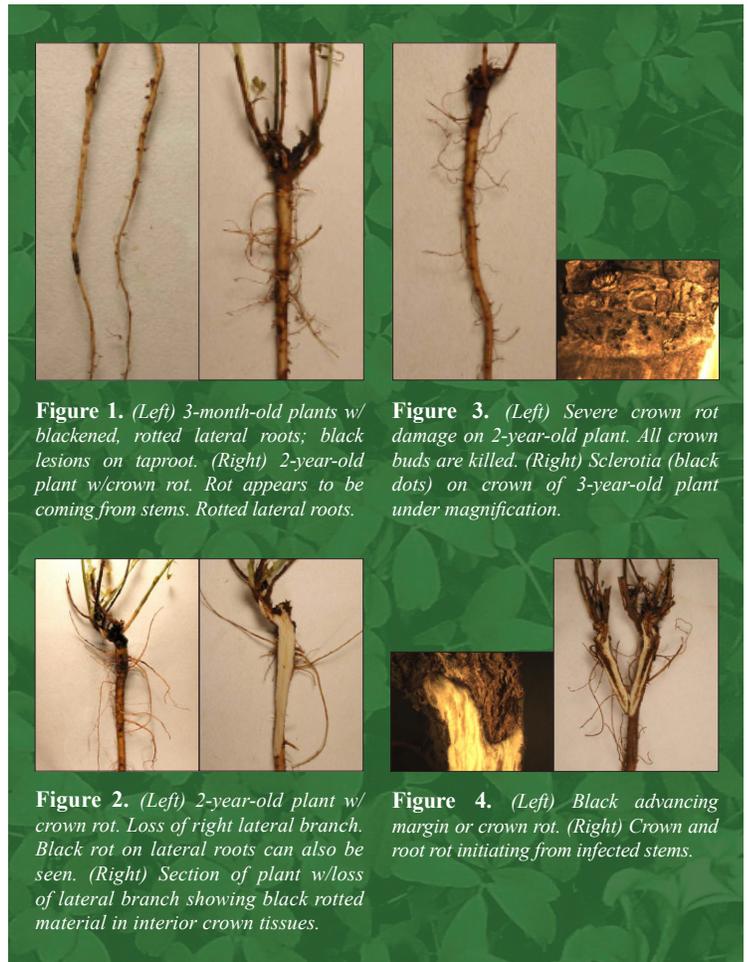
The fungus causing the disease is *Mycoleptodiscus terrestris*. It has a surprisingly broad host range and has been shown to be highly pathogenic on many legumes including birdsfoot trefoil, white clover, alsike clover, red clover, crimson clover, and soybean, as well as alfalfa. It is a weak pathogen on tomato and cabbage. It also is a pathogen of water milfoil and has been tested as a biocontrol agent for this lake weed. On birdsfoot trefoil the symptoms are root decay and plant wilting followed by plant death. The fungus causes post-emergent damping-off of soybean seedlings which is characterized by reddish brown to black cortical decay of crown and root tissues. The fungus can also cause a dark decay of the lateral root system and taproot of older plants similar to that caused by *Rhizoctonia* root and stem rot. The disease has been reported on soybean in south and central Illinois for many years but has not been considered to be of major importance.

### Disease Cycle

The fungus is assumed to overwinter as sclerotia in plant debris and in soil. Root rot and seedling damping-off is probably initiated by infection from germinating sclerotia. The fungus likely forms spores on diseased crown and stems near the soil line. Crown rot probably results from infected stems or by infection from germinating sclerotia near the soil surface.

### Disease Management

No disease management measures have been developed. At this point there are no known resistant alfalfa cultivars. A standard assay is under development so that cultivars can be tested for resistance and for use in a selection and breeding program. Maize and small grain crops are not hosts for the fungus, so crop rotation may be useful. However, sclerotia are known to be long-lived and may persist over many seasons in the soil. The fungus is reported to be sensitive to several fungicides but chemical control may not be practical or effective in the field.



**Figure 1.** (Left) 3-month-old plants w/ blackened, rotted lateral roots; black lesions on taproot. (Right) 2-year-old plant w/crown rot. Rot appears to be coming from stems. Rotted lateral roots.

**Figure 3.** (Left) Severe crown rot damage on 2-year-old plant. All crown buds are killed. (Right) Sclerotia (black dots) on crown of 3-year-old plant under magnification.



**Figure 2.** (Left) 2-year-old plant w/ crown rot. Loss of right lateral branch. Black rot on lateral roots can also be seen. (Right) Section of plant w/loss of lateral branch showing black rotted material in interior crown tissues.



**Figure 4.** (Left) Black advancing margin on crown rot. (Right) Crown and root rot initiating from infected stems.

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