



Weir's Cushion or Spruce Needle Rust: *Chrysomyxa weirii*

Introduction

Several species of fungi in the genus *Chrysomyxa* cause rust diseases, leading to varying levels of defoliation on spruce. One of concern to in the Northeastern U.S. is *Chrysomyxa weirii*, causing a disease known as Weir's cushion rust or more commonly as spruce needle rust. The pathogen is native to the forests of the western U.S. where it may occasionally a cause significant, but rarely lethal, defoliation. However, beginning in the 1990's, the fungus began to be reported from sites in Vermont, New York, and Pennsylvania. This disease is of greatest concern on Colorado blue spruce where it causes discoloration and pre-mature shedding of the year-old needles. By now the disease is likely to be much more widespread across this region, and the Clinic typically sees several samples each year.

Symptoms and Signs

The fungus overwinters in needles infected the previous year. Yellow spots or bands may develop on needles over-winter or in early spring at the sites of infection. Unless the tree was known to be infected however, these yellow spots (**Figs. 1 and 2**) by themselves are not diagnostic of this disease. As spring weather warms, fruiting bodies begin to develop within those infection sites and waxy, yellow-orange pustules composed of masses of spores begin to erupt through the needle surface. The development of these pustules on the previous season's growth in the spring prior to bud break is highly characteristic of this disease. In New York, these bright yellow waxy pustules are usually fully developed and beginning to produce spores by late April or early May.

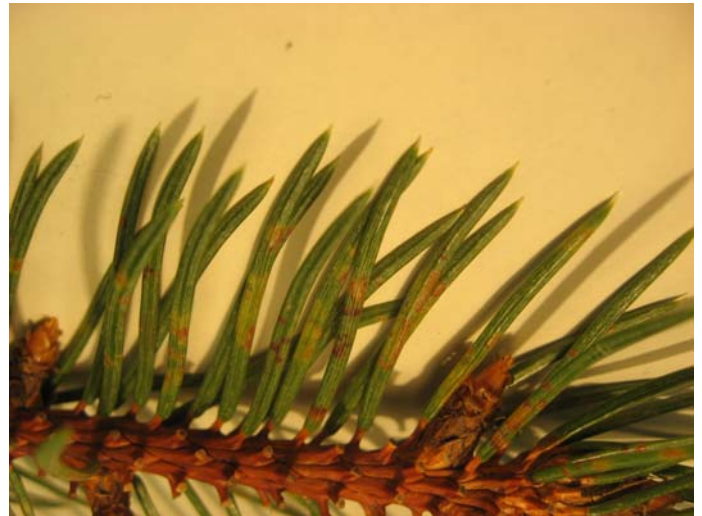


Figure 1. The earliest symptoms, yellow bands or spots developing on blue spruce needles (provided by S. Jensen, Cornell University)



Figure 2. Fruiting bodies (telia) just beginning to cause a swelling of the surface on infected blue spruce needles (provided by S. Jensen, Cornell University)

Disease Cycle

This spruce needle rust is somewhat unique, because it does not require an alternate host. Needles that become infected in the spring begin to develop yellow spots or bands in late winter or early spring of *the following year*, with bright yellow waxy blisters developing on the discolored areas of the needles. As the pustules develop, the surface of the needle may begin to split and as the fruiting body continues to mature, they release masses of yellow-orange spores (**Figs. 3 and 4**) that infect the newly emerging growth. Soon after sporulation is complete, the needles infected the previous year begin to drop from the tree. Where infection levels were heavy, many of the previous season's needles may be lost. Over time, heavily infected trees may be weakened or become less aesthetically pleasing, but they are rarely killed.



Figures 3 and 4. An individual pustule just splitting open on the L, and spores developing from more mature fruiting bodies on the R. (provided by S. Jensen, Cornell University)

Management Strategies

As branches of severely infected trees become weaker, new shoot growth produced each season may be they reduced. Over time, if most older needles are lost each season, trees may take on an odd appearance as only tufts of healthy growth may be present at the ends of affected branches.

As with most needle diseases, this problem may be more severe on the lower branches, however as the

fungal spores may be wind dispersed, in low lying areas, the fungus may colonize the foliage at all levels with only the very tops of larger trees exhibiting minimal evidence of disease. In a landscapes, if this problem is noted early when infection levels are still low, it may be possible to prune out some of the worst of the lower branches to try to minimize future infections. However, if plants are located in valleys or other low lying areas, or surrounded by tall trees or structures that may restrict airflow, plants may suffer more severe level of infection (**Fig.5**) that will likely require some treatment to preserve the aesthetic value of the tree. As the pathogen is fungal, moist conditions on the needles allow may increase infection. Trees planted in open areas or high elevations, where foliage may dry more rapidly following rainfall, may naturally exhibit much lowers levels of infection.



Figure 5. Blister-like fruiting bodies on blue spruce needles in the spring. Note that buds are swollen, but have not yet broken. (provided by Dr. George W. Hudler, Cornell University)

Several fungicides that contain the active ingredient chlorothalonil are now registered to help manage this disease in landscapes and/or nurseries or plantations. Where needed, a fungicide applications should be made using product registered for the specific site and beginning when bud break is about 10% complete. Two more applications should be made at 7 to 10 day intervals. These fungicide are designed to try to protect the new growth as it emerges. Keep in mind

that you are not likely to obtain 100% control even with good timing and good spray coverage, however with properly made applications, you should be able to minimize the infection and thereby also minimize future premature needle loss. Note that some labeled products are agricultural use only and may be more suitable for use in nurseries or Christmas tree plantations than for landscape or residential use.

References:

“Diseases of Trees and Shrubs”, 2nd ed. by W.A. Sinclair and H.H. Lyon. 2005, Cornell University Press.

“Christmas Tree Diseases, Insects, & Disorders in the Pacific Northwest: Identification and Management”, ed. by Gary A. Chastagner. 1997, Washington State University Cooperative Extension.

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READ THE LABEL BEFORE APPLYING ANY PESTICIDE! Changes in pesticide regulations occur constantly. All pesticides distributed, sold, and/or applied in New York State must be registered with the New York State Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide use in New York State should be directed to the appropriate Cornell Cooperative Extension Specialist or your regional DEC office.

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