



Fir Fern Rusts: *Uredinopsis* spp. & *Milesina* spp.

Introduction

Several species of rust fungi may be found infecting various species of fir, and some of the more important rust species are in the genera *Uredinopsis* and *Milesina*; these diseases are more commonly known as fir-fern rusts. These rusts are characterized by the production of white fungal spores, while other common rust genera that infect fir produce yellow or orange-yellow spores.

Many of the *Uredinopsis* and *Milesina* species causing fir-fern rusts have more than one fir host, although each may have a specific fern host. Several species are perennial in the host, growing for several years in the needles before killing them. Others infect and kill current year's needles within weeks or months of infection.

Symptoms and Signs

The fir-fern rusts characterized by cylindrical or tongue-shaped, white fruiting bodies called "aecia," which may form on yellow or even green needles (Fig. 1). These blister-like aecia (Fig. 2) break through the epidermis of the needle as they mature, and shortly thereafter, they burst open and begin to release spores that will cause infection on the fern host(s).

Depending upon the species of the rust, the fungus may overwinter either on the fern or as mycelium in living fir needles. Where a rust species does not kill the infected fir needles the first season, it may become perennial in the needles and twigs. Each year thereafter, the pathogen forms aeciospores on the newest needles until the infected twig eventually dies.

Where the fungus does not overwinter in the fir needles, spores are produced in the spring and carried by the wind back to newly emerging fir needles.



Figure 1: The yellow needles may be symptomatic of infection by a rust fungus (provided by Dr. George Hudler, Cornell University).



Figure 2: The white, blister-like fruiting bodies on the underside of these fir needles are the aecia (provided by Dr. George Hudler, Cornell University).



Figure 3: A close-up showing white spores being liberated from the aecia. (provided by Dr. George Hudler and Kent Leefer, Cornell University).

Management Strategies

If infected ferns in the area **are not** protected species, then removal of ferns may be another option to try to break the fir-fern rust cycle. Remove ferns in areas near trees by mowing them or using a registered herbicide on them. Alternatively, or in conjunction with fern eradication, use a registered fungicide to protect the trees when possible.

Only a few fungicides may be available for managing *Uredinopsis* spp. of rust on fir grown in nurseries or Christmas tree plantations in New York. Some formulations containing neem or triadimefon may be registered but keep in mind that these products are best used preventatively, not curatively so multiple approaches may be best in managing these fungi.

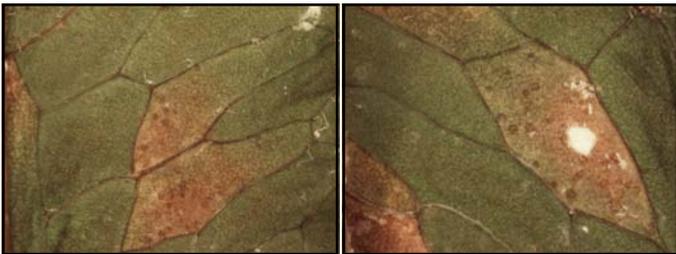


Figure 4: Lesions on the fern host (provided by S.L. Jensen, Cornell University).

Avoid planting fir trees in areas with poor air drainage such as low areas. Space trees well and manage weeds to promote better airflow and more rapid drying of foliage following rainfall.

References:

Sinclair, Wayne A. and Howard H. Lyon. 2005. *Diseases of Trees and Shrubs*, 2nd ed. 660 pages Comstock Pub. Associates

Derived from: <http://www.plantpath.cornell.edu/Trees/PloidNcst.html>

Updated, SLJ, 2/15

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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