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David Wysong

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# Dothistroma Needle Blight of Pines

David S. Wysong  
Extension Plant Pathologist

For several years many pines in windbreaks and ornamental plantings in Nebraska and adjacent states have been losing their needles prematurely. Several fungi may cause early needle drop (casting) in pines. Diagnosis of pine samples submitted to the University of Nebraska, however, indicate the predominant disease is *Dothistroma* needle blight, caused by *Dothistroma* pine.

## Symptoms

On Austrian and ponderosa pines, the first symptom is yellow to tan spots that appear on infected 1, 2, or 3-year old needles during the fall. These spots turn brown or reddish-brown (Fig. 1). They are circular or slightly oblong and may develop into a band around the needle (Fig 2). The fungus grows within the tissues, killing the end portion of the needle while the base remains green (Fig. 3).



Fig. 1. The first symptom—yellow to tan spots.



Fig. 2. Yellow to tan spots may develop into a band around needle.

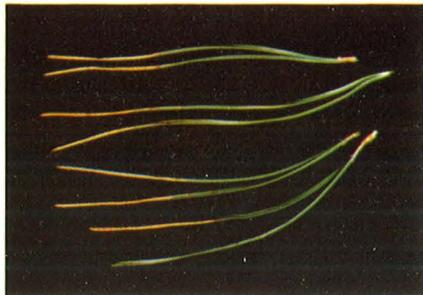


Fig. 3. End portion of needle dies, base remains green.

Typically, clusters of needles within a shoot are uniformly infected. Infection is usually more severe among the lower branches. As the disease progresses, the base of the needles dies and the needles drop. Infected needles may be dropped during the winter, but the greatest loss usually comes during late spring or early summer. Continued infection over a number of years can kill the tree.

## Causal Fungus<sup>1</sup>

The fungus that causes Dothistroma needle blight is *Dothistroma pini*. Fungus spores (seeds) develop in the small spots or bands on the needles, maturing in the spring following the year of infection. Spores are released from pustules during periods of rain from May through September. Germinating spores enter needles through natural openings and infection proceeds. Symptoms appear about 3 to 4 months after first infection occurs.

First year needles are initially resistant to infection, becoming susceptible in mid-summer. Second year and older needles are fully susceptible to *D. pini*.

## Hosts

In Nebraska Austrian pine (*Pinus nigra*), ponderosa pine (*P. ponderosa*), and Mugho pine (*P. mugo*) are attacked by this fungus. Scots pines are not damaged by *D. pini*; Scots pines intermingled with severely infected Austrian pines have remained free of infection. Scots pines are susceptible, however, to the Brown Spot fungus, *Scirrhia acicola*, which causes a disease similar to Dothistroma needle blight. Current information indicates that the Brown Spot disease of Scots pine can be controlled by methods used for control of Dothistroma needle blight.

## Control

Standard strength Bordeaux mixture, either fresh or commercially prepared, provides excellent control when applied twice during the growing season. Satisfactory control is also obtained with other copper-containing fungicides such as tribasic copper sulfate, cuprous oxide, TC-90, and C-O-C-S. Currently the following spray schedule is recommended:

The first fungicide application should be made in mid-May, and the second in mid-June. The first spray protects the previous seasons' needles and the second spray is necessary for protection of newly developing needles. The fungicide acts as a protective coating for the needles. When the spores of the fungus come in contact with the fungicide they are killed.

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<sup>1</sup> Based on research conducted by Dr. Glenn W. Peterson, Plant Pathologist, U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, cooperating with the University of Nebraska Agricultural Experiment Station.

## How to Prepare Fresh Bordeaux Mixture

Bordeaux mixture is made by mixing a solution of copper sulfate (also known as bluestone or blue vitriol) with a suspension of hydrated lime in water. Standard Bordeaux mixture, a 8-8-100 formulation, consists of 8 pounds of copper sulfate and 8 pounds of lime per 100 gallons of water. Smaller quantities can be made by dissolving 3 teaspoonfuls of copper sulfate in 5 teaspoonfuls of hydrated lime into 1 gallon of water. Any desired amount of spray material can be prepared by proportioning the 3 components either by weight or volume.

Copper sulfate is sold as crystals or as a fine powder. It dissolves readily in powder form but rather slowly in crystalline form. Crystals can be dissolved in a few hours, however, by suspending them in a loose-meshed bag or cloth sack so that the bottom of the sack merely touches the surface of the water. If the water is warmed, the copper sulfate crystals will go into solution much more quickly.

To make Bordeaux mixture:

1. Dissolve the copper sulfate in water in a wooden, earthen, or glass container (do not use a metal container).
2. Place the hydrated lime in another container of water and strain the mixture through cheesecloth.
3. While the solution is being agitated, slowly and simultaneously pour the copper sulfate solution and the lime-water mixture into enough water to make the desired amount of spray.

Bordeaux spray deteriorates rapidly and should be used within 2 or 3 hours after it is prepared.

## Career Opportunities in Plant Pathology

To pursue a career in pathology<sup>2</sup> is to pursue a way of life that is essential — exciting — and rewarding.

Plant pathology is as essential as life's necessities. How well plant diseases are curbed determines how well we eat, what we wear, and our ability to provide shelter.

Plant pathology is as exciting as a contest in which the underdog wins. It pits the energy of a few against a vast destructive force. In the United States there are approximately 2600 plant pathologists who, as scientists, educators, and businessmen continually wage war against more than 50,000 destructive plant diseases. All animal life including man is still utterly dependent on plants for food. Thus, prevention of plant disease is one of the sciences which is basic to man's survival.

Plant pathology is rewarding. It is a profession, not just a "job". It requires intelligence, ambition, skill, and dedication. It offers opportunities for intellectual and personal fulfillment. It offers the satisfaction that comes from contributing to the well being of all mankind.

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<sup>2</sup> Taken from *Careers in Plant Pathology* prepared by the American Phytopathological Society, Public Relations Committee, Arden F. Sherf, Chairman.