

At ArborLawn, one of our primary goals is to further the knowledge of our customers. This information will give you a better understanding of the needs of your trees so you will be able to make more informed decisions regarding their care.

## Rhizosphaera Needlecast on Spruce

Spruce, in particular, Colorado blue spruce, can be infected with a needlecast disease caused by the fungus *Rhizosphaera kalkhoffii*. Trees planted in nurseries, Christmas tree plantations, and landscapes can be infected. Trees are not usually killed by this disease; however, premature needlecast results in trees that are not marketable, or which are not acceptable in the landscape.

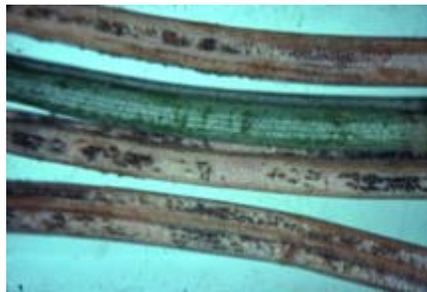
### Symptoms and Disease Cycle

A healthy spruce will retain its needles 5 to 7 years. A spruce severely infected with *Rhizosphaera* needlecast may hold only the current year's needles. *Rhizosphaera* needlecast infects needles on the lower branches first and gradually progresses up the tree. This pattern holds true for most needle diseases on conifers and is the result of more favorable conditions for disease development near the ground. Under epidemic conditions, lower branches may be killed by this fungus.

Although needles on new growth become infected in May and June, symptoms are not visible until late fall or the following spring, when infected needles turn purple to brown and begin to drop (Figure 4). Tiny fruiting bodies of the *Rhizosphaera* fungus protrude through the stomata of the infected needles. Under a hand lens, these stomata appear as fuzzy black spots instead of their usual healthy white color (Figure 5). During wet weather in late spring, spores are released from these fruiting bodies and are rain splashed onto newly developing needles where infection occurs and the disease cycle is repeated.



**Figure 4. Defoliation of spruce caused by *Rhizosphaera*.**



**Figure 5. Fruiting bodies of *Rhizosphaera* erupting from infected needle.**

### Maintain Tree Vigor

Although detailed studies are lacking, it has been observed that trees suffering from environmental stresses are often more seriously attacked by *Rhizosphaera*. Spruce are particularly sensitive to heavy, compacted soils which become quite dry in late summer. Vertical mulching such soils to improve aeration and water penetration may help lessen the severity of the disease. Root irrigation during dry

weather should also be carried out whenever possible.

### Prevent Spread by Shearing Tools

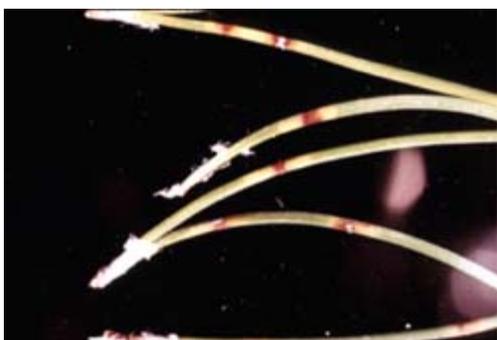
Shearing when the foliage is wet may result in spread of the spores on shearing tools. To avoid this possibility, do not shear infected trees when the foliage is wet (such as when dew is on the foliage in the morning). Shear healthy trees first to avoid carrying the spores from a diseased tree to a healthy one. If this is not possible, tools should be sterilized after shearing a diseased planting. Denatured alcohol, available at most paint stores, will kill the spores and also remove pitch from tools. A three- to five-minute dip will do the job.

## Needle Diseases on Two-Needled Conifers

Most of the "disease" problems encountered on conifers are actually non-infectious disorders resulting from the plant being out of balance with its environment. Dry weather will often cause browning of needle tips or browning and drop of second year needles. Trees growing in sites which are wet early in the year are less tolerant of summer drought. Such trees may rather quickly turn yellow and die in the late summer. Nevertheless, some fungal needle diseases of conifers can cause considerable damage. In such cases, control measures may be needed.

### Lophodermium Needlecast

This needlecast disease is caused by the fungus *Lophodermium seeditiosum*. Fungal fruiting pustules develop on fallen needles over the summer. They show up as black, football-shaped protrusions on the needles. From August to October, during wet periods, windborne spores are released, which infect the current year's needles, resulting in a small brown spot, often with a yellow halo (Figure 3).



**Figure 3. Infection spots of Lophodermium on pine needles.**

The Spanish and French green strains of Scots pines have been especially hard hit; other two-needled pines such as red or Austrian may be infected. The small yellow to brown spots become apparent on the one-year-old needles in March and April. By May, many of these needles have turned brown and begun to fall off. The defoliation may be more severe on the lower portions of the tree. As the new needles come out, the damage to the tree is often masked.

### Cyclaneusma Needlecast

This needlecast, caused by *Cyclaneusma minor*, is also found on Scots pine. In early summer, yellowing of the previous year's needles may be noted.

Transverse brown bands are often present on needles as well. The fruiting

pustules of the fungus are small, tan, elongate and protrude slightly above the needle surface (Figure 7). They are seen on fallen or still attached brown needles during a rainy or damp period.



**Figure 7. Fruiting pustules on needles of Cyclaneusma-infected pine.**

The most damaging period for infection by the *Cyclaneusma* needlecast fungus appears to be on year-old needles in early spring. Most infections occur before the current season's buds have broken. However, this fungus can infect needles throughout the year during damp weather when temperatures are above freezing. Infected needles will tend to drop throughout the year.

### Control of Needle Diseases

Control of these diseases involves cultural modification as well as chemical protection. Scots pine should not be planted in areas that will be shaded from the sun in the morning hours or in fog or dew prone locations. In plantations where there are only a few diseased trees, remove them and burn them along with their fallen needles. Do not allow weeds or tall grass to grow up around

the Scots pine. Thin out plantings which are crowded. Prune trees appropriately to promote air circulation within and among trees. Since these diseases infect needles at different times of the year, it is important to determine which disease is present before employing a fungicide. Laboratory diagnosis may be needed. Colored spots or bands on needles can be caused by insects or other injuries, and are not sufficient evidence of the presence of infectious diseases.