



## The Plant Doctor's LANDSCAPE TIPS

By David L. Roberts, Ph.D., Senior Academic Specialist, College of Agriculture and Natural Resources, Michigan State University

### SPRUCE DECLINE IN MICHIGAN

#### INTRODUCTION:

The health of spruce (*Picea* sp.) trees has taken a definite turn for the worst in recent years (Photo 1). Reports have been received from all over Michigan and, for that matter, other states about alarming increases in decline and death of spruce trees in landscapes, forest areas and to some extent nursery and Christmas tree production. From what we know at this time, there is no single factor contributing to this malady. Rather, spruce is susceptible to a wide variety of pests and diseases, and as with most trees, spruce is also affected by many cultural and environmental issues. Furthermore, there is tremendous diversity among various spruce species and their related cultivars to specific problems. Colorado Spruce (*Picea pungens*) tends to be a magnet for many pests and diseases and if there was a list of the Dirty Dozen landscape trees, Colorado Blue Spruce would probably head most arborists' list, ...except a healthy, vigorously growing Blue Spruce is a "beautiful thing" to behold. By comparison, at least in the author's opinion, Norway Spruce (*P. abies*) and Serbian Spruce (*P. omorika*) have traditionally had far fewer health issues including pests and diseases. Nevertheless, even the relatively trouble-free species seem to be succumbing to what might be placed in a nebulous, catch-all phrase - "Spruce Decline."

#### CONTRIBUTORS TO SPRUCE DECLINE:

An attempt will be made herein to briefly discuss what are currently believed to be the major factors associated with Spruce Decline. Again, it is very important to understand that rarely is only one factor found on a specific spruce tree exhibiting decline symptoms. Most commonly, several factors are associated with Spruce Decline. Various factors may cause stress, further predisposing trees to other issues.

**Phomopsis Canker:** Initially discovered by the author in the late 1980s in Michigan, this disease was originally thought to be primarily limited to smaller spruce trees (Photo 2). Recently however, the fungus has been associated with branch dieback (and tree death) on many mature species of spruces in the landscape (1). The author believes that Phomopsis is a major contributor to spruce decline in Michigan. Compared to *Cytospora* canker (below), Phomopsis seems capable of attacking branches anywhere on the tree (Photo 3 and Inset). Phomopsis is well-known to kill nursery-sized trees but is now believed to be capable of contributing to decline and death of mature spruce trees.

**Cytospora Canker:** A long known disease is *Cytospora* canker, which typically attacks the lower branches of mature spruce trees (Photo 4). Generally, *Cytospora* does not kill trees but gradually "prunes" lower branches as it moves up the tree over a period of many years.

**Needlecast Diseases:** *Rhizosphaera* needlecast has been prevalent in Michigan for many decades (Photo 5). Other needlecast are reported in the scientific literature and may also occur on specific trees. In recent years, a new

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**Photo 1:** Many spruce trees around Michigan seem to be declining at an accelerated rate. The cause is not directly understood but is probably attributable to multiple factors.



**Photo 2:** Phomopsis canker was discovered by the author in the late 1980s and was believed to primarily attack smaller spruce trees; Phomopsis was known to be lethal to spruce trees.



**Photo 3:** Phomopsis has been discovered attacking branches on large spruce in

recent years. Cankers may cause resin release and are disclosed (brown cambial regions) by scraping the bark (Inset).



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**Photo 4:** Cytospora canker generally attacks lower branches and, over many years, gradually works its way up the tree.



**Photo 5:** Needlecast diseases such as *Rhizosphaera* typically attack previous years' needles. As with *Rhizosphaera*, *Stigmina* (*Mycosphaerella*) produces fruiting bodies (reproductive structures) on spruce needles. (Inset Photo Credit: Dr. Dennis Fulbright).



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needlecast known as *Stigmina* (1), more accurately called *Mycosphaerella*, has been found in Christmas tree production, in nurseries and in landscapes (Photo 5 Inset-note appendages on the dark fructification typical of *Mycosphaerella* and not *Rhizosphaera*.) Needlecast diseases typically do not kill branches unless many years of defoliation occur.

**SNEED:** Known as Sudden Needle Drop or Spruce Needle Drop, the primary cause is believed by some to be a *Setomelanomma* fungus. However, some scientists believe this is not an actual disease agent but an opportunistic fungus that colonizes the bark of healthy and declining trees. More should be forthcoming on this issue.

**Spruce Spider Mites:** During some climatic stresses, especially heat and drought, spruce spider mites can cause severe needle drop on many spruce species.

**Spruce Adelgids:** Although Cooley and Eastern Spruce Galls are easily recognizable, the susceptibility of some individual trees even within a species can be alarming, culminating in many bare twigs and branches.

**Pitch Mass Borer:** The Pitch Mass Borer (*Vespa mima*) is a clear wing moth that attacks spruce trees. Sometimes killing the top of trees (Photo 6), the borer may cause copious sap release on the trunk of infested trees (Photo 6 Inset).

**Other problems:** As with other conifers, spruce is susceptible to a wide variety of other pests and diseases as well as cultural and environmental issues such as planting problems (Photo 7), moisture and fertilizer inputs, herbicides, winter injury and frost and so forth. *Diplodia*, the cause of Tip Blight of Pines, is capable of attacking spruces, but is not considered a serious threat at this time; it may, nonetheless, occasionally contribute to spruce decline. Spruce was highly sensitive to the recent Imprelis herbicide (Photo 8) issue which is a temporary phenomenon limited to a relatively low population of spruce; Imprelis not part of the Spruce Decline issue discussed in this article.

### MANAGING SPRUCE DECLINE:

Spruce trees may contract individual issues that can be diagnosed and managed appropriately; specific details for individual issues can be found in other *Landsculptor* publications. With Spruce Decline, however, several issues are invariably involved. Some general guidelines for managing Spruce Decline are discussed as follows.

**Diagnose:** It is vitally important that spruce problems be diagnosed accurately to determine what management procedures are warranted and what procedures may offer the best chance of aiding the recovery and health of the tree.

**Vigilance:** Arborists that maintain trees in landscapes should keep a sharp vigilance for specific problems before they become serious. If we are astute, we will most likely notice specific issues before the tree owners do. And, because arborists may only maintain trees on a specific property, it could be important to know what inputs other landscape/turf professionals are prescribing to lawns and landscape areas that may adversely affect the trees.

**Moisture Management:** Many landscapes are designed with irrigation and as such, many landscapes and trees are exposed to frequent, often excessive, irrigation. One of the most important criteria for disease development is the presence of moisture, whether needlecasts, Phomopsis canker or other diseases are involved. Minimizing irrigation, particularly on established plants may dramatically reduce disease development.

**Cultural Management:** In addition to water management (above), various cultural inputs may prove beneficial for Spruce Decline. During dry conditions, sanitation pruning for Cytospora and Phomopsis cankers may reduce the amount of disease in a tree. Addressing other issues such as shading may be helpful.

**Chemical Management:** “Elixirs” of fungicides can often be applied to manage several problems at once. For example, the benzimidazole carbamate class of fungicides (T-Methyl-G, Cleary 3336, etc.) is highly effective for inhibiting Phomopsis canker, and when combined with a contact (Mancozeb, Chorothonil, Copper, etc.) can also help control needlecast diseases. The same is true for insect/arthropod management.

(1) The author would like to acknowledge the research contributions of Dr. Dennis Fulbright, Department of Plant Pathology, Michigan State University. ■

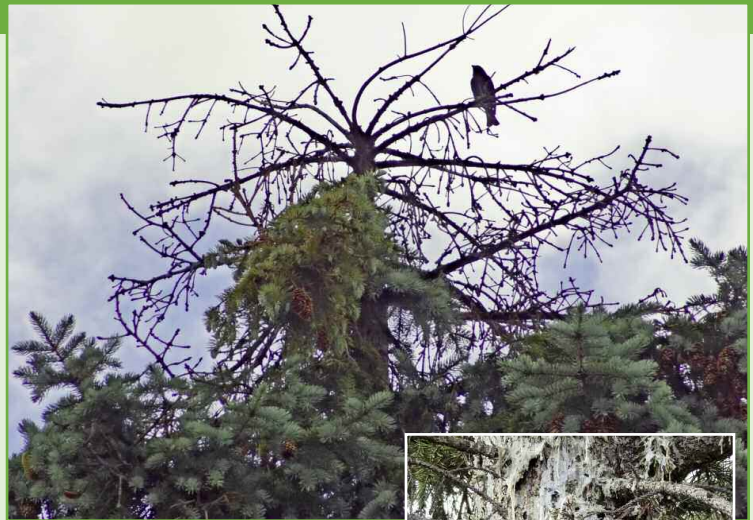
*For more information, please feel free to email David Roberts at robertsd@msu.edu or contact a professional plant health care provider. The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.*

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**Photo 6:** Pitch Mass Borer attacks the trunks of spruce, often killing the tops first. Copious sap production on the trunk may be evident from the attack (Inset).



**Photo 7:** Many factors may contribute to Spruce Decline. Here, the roots of these spruce trees were buried with approximately 18 inches of fill 10 years ago. Note stress as evidenced by ring compression starting approximately 10 years back (Inset).



**Photo 8:** Herbicides may contribute to Spruce Decline. However, the recent Imprelis issue is limited in distribution and considered short-term; hence, it should not be included in the phenomenon known as Spruce Decline.